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The OIL WEEKLY

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7,300,000 BARRELS, PENNSYLVANIA'S CRUDE OIL PRODUCTION FOR FIRST SIX MONTHS OF 1944

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ous Drake well at Titusville, crude
as been produced commercially in
nsylvania since 1859. Oil was struck
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depth of 69½ feet, and its daily
ut amounted to about 25 barrels.
to the high price of crude (about
per barrel at that time), the success
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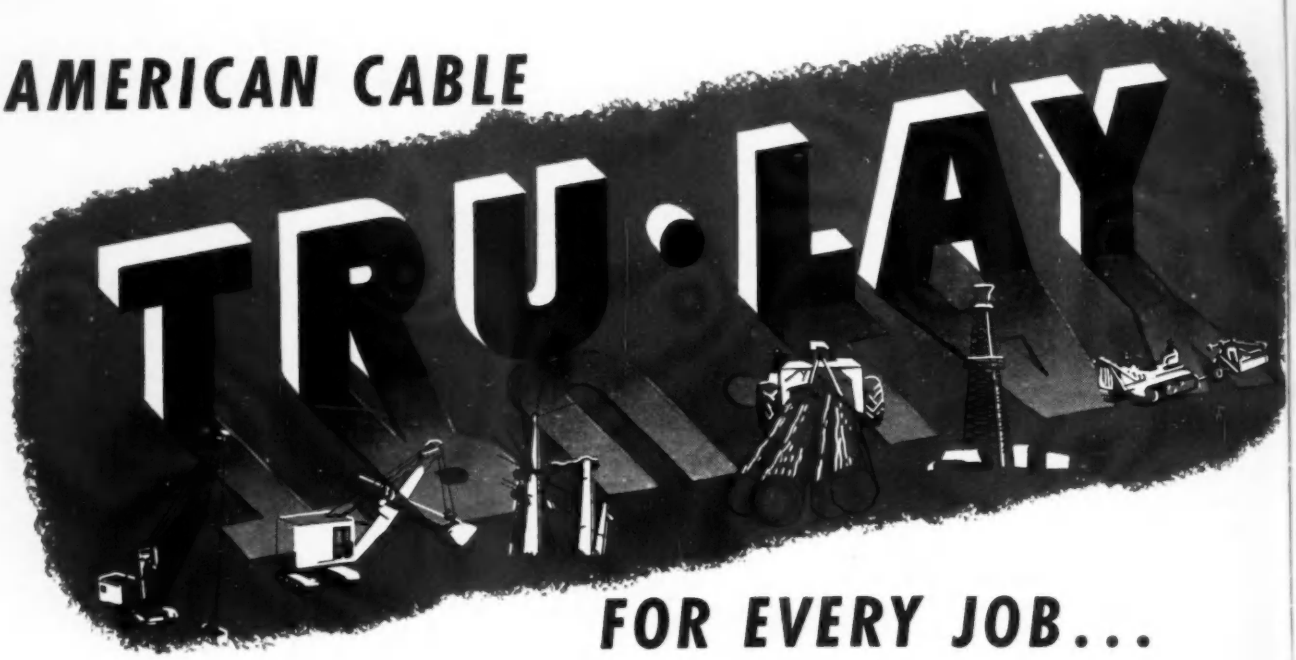

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LOOKING AHEAD
. . . with the Editor

WATER flood operators are interested in the behavior of a water injection well, and the laws which govern that behavior. It is the purpose of an article to be published in an early issue to review the factors which control the injection of water, point out their relationship, and where possible indicate how the well behavior may be predicted.

Included with the article will be a number of graphs, four of which can be used in calculations for predicting the behavior of water flood operations.

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Published by THE GULF PUBLISHING COMPANY, Houston, Texas

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Contents . December 11, 1944

Volume 116, No. 2

The Changing Panorama 55

International Oil Section:

World Oil Industry Looks Ahead to a Busy Future 66
Control of World Oil Reserves Certain to Be Important Postwar Factor 68
Near East to Assume a Major Role in Markets of World 74
Decided Pickup Registered in Near East Oil Activities 80
Third of Canada Is Rated as Potential Oil Area 82
BY C. O. NICKLE
War Advances Development in Northwest Canada 92
BY C. T. FILLAN
Maritime Provinces Favored in East Canada Prospecting 100
BY C. O. NICKLE
Russian Developments in Both Producing and Refining Are Important Despite War 108
Bolivia Proceeding with Program to Make Nation Self-Sufficient in Oil 113
Venezuela Production at Peak but Still Short of Objective 116
Operations Back to Normal in Colombia and Better Year Ahead 122
Production in the Argentine Maintained During War by Intense Activity of Y.P.F. 124
Index to World Oil Atlas ..... Opposite 128
Mexico Headed for Minor Place in Early Postwar World Petroleum Affairs 128
BY CURTIS VINSON
East Indies Postwar Prospect 134
BY NETHERLANDS INFORMATION BUREAU
Australia Plans Intensive Postwar Search for Oil 140
Results of Wartime Explorations in New Zealand Are Disappointing 142
Oil Activity in Paraguay and England 144

Technical and Feature Articles:

Tanker Design Development 145
BY E. L. STEWART
Humble Billionth-Gallon Observance 148
Modern Natural Gas Transmission Design 150
BY LORING E. HECKMAN
Ickes' Views on Oil Pact Differ with Those of Industry 160
BY WARREN L. BAKER
Operating Hints for Production Men 162

News and Departments:

Looking Ahead with the Editor 51
Washington Roundup 57
BY BERTRAM F. LINZ
Pipe Line Review 167
Markets, Statistics and Prices 169
United States Field Operations 171
United States Exploratory Completions 185
United States Wildcat Starts 188
Squeaks from the Bull Wheel 189
Notes for the Equipment Buyer and User 190
Index to Advertisers 192

Published Every Monday. Single Copies 15 cents (Except Special Issues). Subscription price: domestic and foreign, $2.00 a year; 2 years, $3.00. Advertising rates on application.
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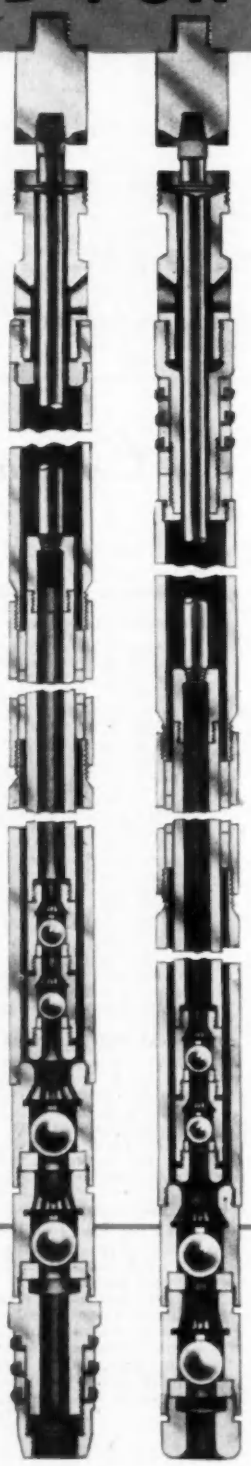

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The Changing Panorama

New Anglo-American Oil Agreement?

ELSEWHERE in this issue of THE OIL WEEKLY will be found the draft of a suggested international treaty between the United States and Great Britain relating to petroleum, offered by the Petroleum Industry War Council as a substitute for the treaty agreed upon sometime ago between representatives of the United States and Great Britain and later submitted to the United States Senate for ratification. It will be recalled that the proposed treaty, on being made public, immediately came under the fire of the oil industry and a great many individuals, both in this country and in England and that its death knell was apparently sounded a short time ago when the Senate foreign relations chairman said that it would not be brought out of the committee.

The new proposal apparently has removed the objections which the oil industry and others had to the original plan. It seemingly has removed the cartel portion of the plan and, so far as we can see, has removed the threat of federal control without supporting legislation in both houses of the Congress. What it does do is to provide for equal opportunities between nationals of Great Britain and the United States in the exploration and development of petroleum in areas controlled by the respective nations, and provides for a commission which is largely fact-finding and advisory in nature.

The PIWC proposal does not offer the air-tight control of production which the former plan contained, but in the original proposed treaty such control was obtained at the expense of some very dangerous provisions.

Those who objected to the cartel features of the other proposed treaty will not likely find such objection in the purely fact-finding and advisory nature of the commission proposed in the substitute.

PIWC did not offer the plan as a letter-perfect one and suggested that it should have wide discussion before finally being passed upon and offered to Great Britain as the American proposal for a treaty.

It is possible that the elimination of the cartel system from the treaty may not meet with the approval of British oil interests who have operated under that system almost to the same extent that American industry has operated under a system of free competition. Contrariwise, it is possible that the British people may favor elimination of the cartel feature in the thought that it may make petroleum products less expensive in England. On the other hand, we see nothing in the proposal which would require Great Britain to give up the cartel system although the new draft definitely eliminates the obligation of the United States to participate in such procedure.

Opponents of the theory that the United States should import heavily of the crude oil of other nations, thereby saving its own oil for a future date, will be pleased to note the provision under which any signatory nation may limit its imports of oil. The independent oil interests have been most insistent on the right to such limitations, pointing out, and with justice, that unreasonable imports would seriously damage the domestic industry which has carried the brunt of providing oil to fight the present war, and World War I.

Treaty Vote Change

THE current attempt to discard the rule requiring that all treaties be ratified by a two-thirds majority of the Senate is a matter of great importance to the United States. It is of especial interest to the petroleum industry at this time, because the Anglo-American oil agreement has been submitted to the Senate for ratification as a treaty.

The proposal, provided for in a bill introduced by Senator Pepper of Florida, is to substitute a rule that a mere majority of both houses would suffice to ratify a treaty. One drawback is that such a change would tend to turn this vital business over to a single political party. A strong President, with his political party in control of Congress, would practically control the situation, enabling him to line the United States up with almost any country or bloc he favored.

A simple congressional majority also would make it possible for a certain section of the country to monopolize treaty-making power. For example, the states along the Atlantic seaboard, plus Ohio and Illinois, could pass any treaty they wanted if a majority vote of both houses were the rule.

Conservation Given Attention in Texas

TEXAS operators, particularly those interested in production and disposition of natural gas and its products, will await with considerable interest, the results of a recent gathering of representatives in Fort Worth. The meeting was called in advance of the 49th session of the Texas Legislature on January 9, in recognition of the fact that questions involving development of natural resources will be a major problem during the session, this conference wishing "to assure drastic economy and open the way for full development of Texas' natural resources."

Representative Arthur Cato of Weatherford is general chairman, with Lt. Marvin Simpson, Jr., of Fort Worth, and Representative Mack Allison of Stephenville as co-chairmen. Since the last session of the legislature, there has been much discussion of possible legislation dealing with natural resources, particularly gas, and Governor Stevenson has indicated that the latter would be an important subject to come before the legislative body in January.

The question of modern oil and gas legislation has received more than a little attention of late, what with the rapid development in production and in extracting the many valuable products from gas without losing the gas itself as a means of conserving irreplaceable reservoir energy. Public utterances of members of the state regulatory body in recent weeks, together with the Fort Worth conference itself, are considered encouraging signs of recognition of the need for up-to-date statutory bases upon which to construct a sound program for conservation of the natural resources of Texas.

States Must Act or Washington Will

TEXAS legislative authorities, regulatory body members, the oil industry and more important than all of the foregoing, the Texas public, have a stake in improving state conservation laws so that the threat of federal control and interference will be turned aside.

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as well) do the very best job possible, we can expect Washington to make an attempt to take over.

This is not to be construed as an admission that the conservation laws in Texas and all other states are bad. As a matter of fact, they are not, but they are subject to improvement, particularly as relates to natural gas and distillate production, and it would be far better for the state and the industry to do the job than to have it taken over by a federal bureau.

We recommend the Arkansas conservation law as something to be considered in any study looking to improvement of the conservation laws of Texas, or of other states.

New Evidence

FURTHER evidence of the increasing possibilities of highly desirable products from natural gas is reflected in the report current this week that a large plant, involving the expenditure of several million dollars is being contemplated for the Carthage, Texas, gas field.

The plant will use an improved Fischer-Tropsch process and will produce premium petroleum products, including an 83-octane gasoline and a grade of diesel fuel greatly desired by the navy.

The gas reserves of the Carthage field, which lies in Panola County, Texas, are estimated at three and a half trillion feet.

Copper Agreement Next on Program

AN INTERNATIONAL cartel on copper may soon be in the process of development. Leading copper-producing nations are being sounded out on the possibility of an international copper conference, according to *Wall Street Journal*, which states "It may lead to establishment of what would be in effect, if not in name, an inter-government cartel."

This is of special interest to the petroleum industry, because so many oil men have predicted that the Anglo-American oil agreement was the forerunner of similar accords on numerous other essential commodities, and that it established the pattern for these probable later accords.

The objectives would be to consider the question of overproduction after the war is over. This is the same reasoning that led to the oil discussions that drafted the Anglo-American oil agreement.

Our State Department has taken the position that it is not the concern of the United States as to what type of government a European nation chooses—that each people should choose its own form of government. We have been under the impression that we are in a pretty heavy war because of the kind of government at least two nations have chosen.

Colombian Decision

THE recent action of the supreme court of Colombia in holding for the Tropical Oil Company in the suit brought against it by the government in connection with a dispute as to the length of the life of the DeMares Concession, will unquestionably have a favorable effect on oil prospects of Colombia.

The decision, which was unanimous, showed that in Colombia the supreme court is not influenced by governmental desires, but by its interpretation of the law and the evidence, and it continues the well established reputation of Colombia as a country where the courts reflect justice rather than partisanship.

We do not question the motives of the government in claiming as valid its own opinion as to the expiration date of the concession. But we have seen of late so many decisions of supreme courts in which apparently the wishes of the government, rather than the law, precedent or the evidence, ruled, that it is genuinely refreshing to have our faith in Colombian courts maintained. We say this, not because we in our mind had pre-judged the case, but because the decision made by the Colombian supreme court was not the easiest made and in our opinion reflected a fair and non-partisan approach to the question.

Treaty Language

WRITING in *Collier's* magazine of December 2, Secretary of the Interior Harold L. Ickes offers an interpretation of the Anglo-American oil agreement (see article on page 160 of this issue) which is entirely different from the meaning virtually every oil man has read into its provisions. Just what is the meaning of the agreement?

While Ickes' article undoubtedly will further cloud the issue, it serves one most useful purpose. It shows clearly why the document's language has been charged by both Americans and the British with being so vague as to make any definite interpretation possible.

This leads to the conclusion that simple and definite writing of every treaty is one of the prime requisites of the world at this time. Otherwise, grave misunderstandings of such nature as to destroy hopes for an enduring peace are almost certain to arise.

Hull Resignation And the Oil Pact

RESIGNATION of Cordell Hull as Secretary of State will not lessen the administration's determination to press for ratification of the Anglo-American oil agreement. Hull's resignation may have the opposite effect.

The new Secretary of State, Edward R. Stettinius, Jr., participated in the discussions leading to the drafting of the oil document, and in his capacity of under-secretary, was the United States government representative who actually signed the agreement.

Questions British Loan to Arabia

THE billions of dollars the United States is advancing to Britain because of wartime necessities have enabled that country to loan $20,000,000 to Saudi Arabia where Americans have developed valuable oil fields and the British are extremely anxious to establish a foothold, Senator Owen Brewster charges in *The American Magazine*.

The Republican Senator from Maine terms "our government's point of view regarding oil during the war . . . incomprehensible" and says it's an "astounding fact that some of our head men in Washington appear to condone British efforts to create a split" between Ibn Sa'ud, King of Saudi Arabia, and American companies controlling the oil fields. He writes:

"British oil prospectors, posing as scientists looking for fauna and flora, driving lend-lease trucks, have been discovered looking for new oil fields in the American sphere of influence in Arabia. With our permission, the British have lent $20,000,000 to Ibn Sa'ud.

"If we continue this attitude, standing idly by while our rights are endangered, our oil industry will suffer immeasurably, and our prestige in the Middle East will be greatly weakened."

The Senator disputes the explanation by British and U. S. lend-lease officials that the reason America has contributed 80 percent of the oil used by the United Nations, while Britain has furnished only 8 percent, is because it's been easier and quicker to ship American oil to Africa and Great Britain.

"If that is true," says Brewster, "then surely our diplomats should have demanded some concessions for American oil after the war to compensate for the depletion of our resources. But the contrary is true."

AFTER THE PARADES ARE OVER

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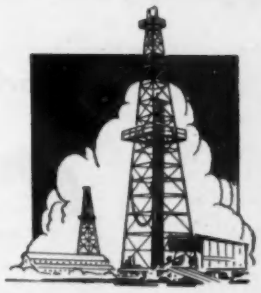


By BERTRAM F. LINZ, Washington Correspondent

A TOTALLY revamped international oil agreement, prepared by the National Oil Policy Committee of the PIWC in response to the challenge of Administrator Ickes to submit "constructive" suggestions for improvement of the Anglo-American petroleum treaty, produced the most important oil news of the week in Washington.

Treaty Clarification—Through it, the industry called upon Ickes and the State Department to make good their promises that the pending treaty, which Chairman Tom Connally of the Senate foreign relations committee had said would never be ratified, would be "clarified" to make explicit their assurances that the pact was not intended to impose an international commission upon the industry, put the government in a position to regiment it, or affect in any way the domestic production of oil to meet domestic needs.

New Start on Treaty—In effect, the action of the council throws the agreement back into the preliminary stage, for adoption of its draft or of any changes based thereon is a subject for renewed negotiations with the British representatives who last summer participated in the framing of the original document.

Ambiguity Eliminated—As written by the council's committee, with the assistance of an expert in international law, Judge Manley Hudson of the permanent Court of International Justice, the treaty would offer no possibilities of application for any of the purposes which the industry saw inherent in the State Department's version. Particularly, the committee eliminated all of the original provisions which had been denominated ambiguous by critics of the treaty and incorporated specific limitations upon the authority of the commission and of the participating governments in any field bordering upon a cartel arrangement, protection for private competition and safeguards against interference with the domestic industry.

Oil Problem Still Acute—The treaty was the major accomplishment of the 33rd meeting of the PIWC, winding up three years of war activity since its first meeting the day following the attack on Pearl Harbor. But other matters considered by the council demonstrated that the critical situation which it was formed to combat has not been eliminated, and the report of the economics committee indicated clearly that the problem of oil is still acute and will remain so until after the defeat of Germany.

Oil Price Probe Asked—There were oil activities in other sectors of Washington during the week. An interim report from the House committee on small business headed by Representative Wright Patman of Texas charged the OPA with driving the independent producer out of business and developing a monopolistic trend in the oil industry through its failure properly to protect crude prices, and called for an immediate investigation of finding, developing and operating costs on which an adequate price structure could be based.

Alaska Fund Denied—At the capitol, too, the House appropriations committee again rejected a request of Secretary Ickes for a $1,075,000 appropriation for investigation of the oil resources of Alaska, which it had turned down some months ago in passing on the Interior Department's annual supply bill.

State Department Changes—From the White House came the first moves in a broad reorganization of the State Department. President Roosevelt repiaced three men who had served former Secretary of State Hull as assistant secretaries with men who have had no previous experience in the department, one of them the millionaire scion of the oil-famous Rockefeller family — Nelson Rockefeller, Coordinator of Inter-American affairs; another, Will Clayton, largest buyer of cotton in the world, and the third, Archibald MacLeish, liberal poet.

Supply and Transportation Tighter as European Fight Continues, PIWC Told

Continuation of the European war through the first half of 1945 will find civilian supplies of oil products in this country "barely adequate" to meet requirements on the present rationed basis, the PIWC was told at last week's council session in the monthly report of its committee on petroleum economics.

The situation will be particularly tight in gasoline, and will not be improved by the shortage of transportation, the committee warned.

PIWC also agreed upon and submitted a revised international oil pact as a substitute for the one now pending in treaty form before the Senate. (See pages 59 and 60.)

In an extension of its supply and demand data through the first six months of next year, which it emphasized was in no way a prediction, the committee placed 1945 daily average production at 4,656,000 barrels of crude and 336,000 barrels of natural gasoline, condensate and benzol, compared with an indicated average for 1944 of 4,582,000 barrels of crude and 287,000 barrels of natural gasoline, etc.

The 1945 estimates, it explained, are based upon calculations of the ability of District 1 to produce, the maximum efficient rates of Districts 2, 3 and 5 and the limitations on the market for black oil in District 4.

District 3 Production

The reduction of output in District 3 to a level of maximum efficient rate can be achieved through greater availability of South American crude of grades that can be substituted for District 3 crude by District 1 refiners, this additional foreign crude availability to come about as a result of the completion, expected next month, of foreign pipe lines now under construction. With this available supply, it was indicated, District 3 could be cut back from its present production of well over 2,700,000 barrels daily (October average was 2,731,000 barrels) to 2,640,000 barrels daily. The report estimated that 1944 output for the district would average 2,628,000 barrels daily as against 2,195,000 barrels in 1943.

With reported imports of 131,000 barrels daily, the committee said, the total new supply for 1944 will average 5,000,000 barrels daily, compared with 4,413,000 barrels in 1943. But in the first quarter of 1945, new supply should run to 5,153,000 barrels daily and in the second quarter 5,191,000 barrels.

However, it was disclosed, the increase in total demand will be considerably in excess of that in supply, the estimated 1944 demand of 5,023,000 barrels daily (compared with 4,455,000 barrels in 1943) being seen as rising to 5,466,000 barrels in the first quarter of next year and then dropping back to

Pacific Section, AAPG Officers

Officers recently elected by the Pacific section of American Association of Petroleum Geologists are shown above, left to right: Robert T. White, Barnsdall Oil Company, vice president; Vincent Vandiver, Seaboard Oil Company, secretary-treasurer; and Glenn H. Bowes, Continental Oil Company, president.

5,180,000 barrels in the succeeding three months, an average of 5,325,000 barrels for the half-year period.

"Recent developments in the war in Europe not only indicate no early end in sight but emphasize the vital role of oil and ammunition as lifesaving factors," the committee said in summation. "Increased estimates of ammunition requirements with which the public has been made familiar have been accompanied by two recent increases in estimated oil requirements, particularly for gasoline. This has been accompanied by a substantial increase in military tanker requirements for movement of this material abroad.

"These increases again create a tight situation in this country both as to supply and transportation and only by virtue of reasonably high East Coast stocks built up in the early fall and by curbing the recent tendency to relax gasoline rationing will it be possible to meet both military and essential civilian needs while the war in Europe continues.

Tight Transportation

"The tight transport situation will continue at least through the first quarter of 1945 and may ease a little thereafter depending upon the course of the war. Tanker availability to District 1 north of Hatteras must total approximately 320,000 barrels daily during the first quarter of next year, and tank cars, pipe lines and indeed all available means of transportation must be used to the maximum to meet the military and civilian requirements and keep District 1 refineries operating at capacity to make needed war products."

The grave view of the supply situation taken by the economics committee was given emphasis in the report of John R. McWilliams, PAW director of production, to the production committee, in which he estimated minimum working stocks at 210,000,000 barrels of crude and actual stocks on October 1 at 223,000,000 barrels, warning that "it is doubtful that stocks can be reduced much below the actual current levels without adversely affecting refinery operations because of the unequal distribution of the stocks as between areas, types of crude and individual operators."

In a review of the general situation, McWilliams disclosed proposed changes in regulations, both for now and for the period following victory in Europe, the most imminent of which is the imposition of a requirement, under P-98-b, that operators obtain prior approval from district directors of materials before applying an AA-1 rating to certain specific items of drilling equipment as MRO materials.

Also, he said, in conformity with recommendations of the district materials subcommittees, PAW has proposed to the War Production Board that mill stocks of oil country tubular goods be increased from 20,000 to 115,000 tons by requiring operators to obtain a portion of large orders and all of small orders of tubular goods from such stocks and by directing mills to set up the needed inventories.

Military Needs Pressing

However, he admitted, the recommendation has been tabled by the WPB for the time being because of the urgent and expanded demand by the military for space in mills manufacturing oil country tubular goods to accelerate the production of shells, bombs and rockets; the lack of mill capacity to provide the enlarged stock and at the same time meet current requirements; and the lack of manpower to make possible the handling of additional tubular goods.

Meetings have been held between representatives of the production and materials division and the chairman of the requirements committee of WPB to discuss the desirable procedure to be followed by the industry in obtaining priority assistance for acquiring materials for operations following V-E Day. A tentative agreement was reached that P-98-b be revised to provide extendable priorities ratings for acquisition of materials to be used in conformance with PAO-11, which, McWilliams explained, means simply that the supplier will be able to obtain replacements for the materials delivered to operators by extending the priority ratings to the manufacturer who, in turn, will be able to extend the ratings for new materials.

Representations also have been made to the WPB construction machinery division to augment the current tractor allotment for PAW in order to get tractors delivered into the field for winter operations, but McWilliams stressed that any additional tractors obtained now will probably cut into future deliveries unless output is considerably increased.

The WPB, he disclosed, has allotted 288,000 tons of carbon steel and 51,000 tons of alloy steel for production operations and MRO requirements of the industry for the first quarter of next year, meeting the request of PAW to fulfill the first quarter drilling program.

Parsons Reports on Materials

The steel supply situation, however, was seen by Claude P. Parsons, PAW director of materials, as tighter during the first months of next year than at any time since the second quarter of 1943, with the increasing number of rotary rigs in operation as presenting the most important single problem.

Parsons pointed out that the unprecedented number of new rigs in operation means an abnormal demand for repair parts and replacements, on which PAW is working with the manufacturers.

The manufacturing problem will be further intensified in 1945, he said, by the foreign petroleum programs which also are expanding. The only item which has recently become more critical, however, is tires for heavy duty trucks, which are still scarce, despite the top civilian priority given the industry, because of tremendous military demands and manufacturing shortages.

Summing up the current situation, Parsons reported that drilling engine deliveries improved during October, when 232 engines of more than 500 cubic inches displacement were delivered; tool joint deliveries are increasing, although not yet in proportion to the increased demand; the drill pipe situation will improve with the increase of tool joints, more pipe now being produced than is being worn out; rock bits are becoming extremely critical again; and tubular goods may become a serious problem after the first of the year, with the increasing military demand and domestic and foreign petroleum requirements.

A WPB report on a recent meeting of the pipe industry advisory committee disclosed that the tubular goods manufacturing industry was opposed to the PAW proposal to increase oil country pipe inventories, following a showing by steel division officials that the expanding shell program has crowded bar, rail and structural mills to capacity and may fan out to include the seamless pipe mills.

A PAW representative at the meeting contended that the proposed increase actually would lower the inventory needs for oil country pipe, since a centralized 115,000-ton mill stock could be used to greater advantage than could inventories scattered among some 16,000 operators, but failed to secure the support of the committee.

PIWC Drafts Oil Treaty and Submits It As Substitute for Pending Measure

A proposed Anglo-American oil treaty, bearing only a faint resemblance to the document signed by State Department and United Kingdom representatives last August 8 and under which the International Petroleum Commission, one of the focal points of the controversy, would be stripped of all authority to do more than make studies and prepare reports, was approved by the PIWC at its December meeting.

Gathered for its 33rd session just two days short of three years after its initial meeting the day following the Japanese attack on Pearl Harbor, postwar problems rather than immediate questions monopolized the attention of the council.

The council's version of the bitterly opposed agreement (see text on next page) definitely establishes the limits beyond which the signatory governments may not go in making their arrangements for postwar international oil trade.

It stated flatly that no provision shall be construed to apply to the operation of the domestic petroleum industry within either country, and provided that any signatory government may limit the amount of petroleum which may be imported into its country.

It "streamlined" the original agreement, eliminating many of the provisions which the industry had feared would give the government a basis for regulatory or restrictive action.

It provided that international oil trade shall be conducted in an orderly manner within the framework of laws applicable thereto "and of concession contracts and laws applicable to them."

It eliminated all provisions suggesting limitations upon production, division of markets or other cartel arrangements.

Judge Hudson Assists

In the four days of deliberations, the committee, which had secured the services of Judge Manley Hudson of the permanent Court of International Justice as special counsel to assist its own lawyers, stripped the original agreement of all provisions which had been regarded as ambiguous, including those in the preamble providing that supplies should be derived from the various producing areas with due consideration of conservation and that they be distributed in accordance with the principles of the Atlantic Charter.

Instead, it provided specifically that supplies should be made available to all countries on a competitive basis.

Article 8 of the original agreement, calling for trade at fair prices and development to encourage the economic advancement of the producing areas, was whittled down to two provisions calling for equal opportunity in the acquisition of exploration and development rights and for the respect of concessions and rights, and a third stipulating that exploration, development or refinery or other operations shall not be hampered by restrictions inconsistent with the purposes of the agreement.

Article II, paving the way for an international conference at which the agreement would be expanded into a multi-lateral treaty, was left unchanged, but Article III, setting up the International Commission, was broadly rewritten with a view to restricting the authority of the commission to studies of the problems caused by dislocations resulting from war, studies with respect to past and current trends in the international oil trade, the making of periodic estimates of world demands and supplies, and the preparation of reports to "facilitate the realization of the purposes of this agreement and the wider understanding of the problems of the international petroleum trade."

Eliminated were those provisions of the original pact requiring the commission to prepare long-term estimates of demand with regard "for the interests of consuming countries"; to suggest the manner in which demand may be satisfied by "equitably distributed" production quotas; to recommend broad policies; an analyze short-term problems, and to make such further recommendations as it might deem suitable.

The limitations upon the authority of the commission were amplified in a new article, providing that no action taken in compliance with a commission report should be deemed an infringement of the laws with respect to restraint of trade, but stipulating that nothing in the agreement shall be construed to require a signatory government to act upon any report or suggestion made by the commission or to require the nationals of a signatory government to comply with any such report or suggestion.

Further Changes Possible

The council, with relatively brief debate, approved the report and proposals submitted by A. Jacobsen, chairman of the national oil policy committee, but in an accompanying resolution emphasized that any member of the PIWC is to be free to present to the Petroleum Administrator or State Department any objections, revisions or additions to provisions which he may consider as having been insufficiently or inappropriately dealt with.

Similarly, in its report, the committee, pointing out that while many of the changes represented its unanimous opinion but in some instances were the weight of its opinion, emphasized that as additional experience is gained further changes and modifications may prove desirable, and "it is assumed that the submission of this report does not foreclose or impede expression of views by individual members of the committee or by others and that the recommendations are not binding as future commitments on members of the committee or of the PIWC, nor will it operate to prevent any member of the national oil policy committee or the PIWC from making such individual or joint recommendations as they may desire."

The council's action followed a demand by Administrator Ickes for immediate disposition of the problem, his desire for speed being in contrast to his position at the October meeting. When he indicated that time was of little importance. Dean Acheson, assistant Secretary of State, also urged that the council make its views known immediately.

In Washington, neither Ickes nor State Department officials would comment on the industry's proposals, pending completion of a detail study, although State Department spokesmen again emphasized that there was no conflict between the government and the industry over principles, but in Chicago December 8, the administrator, in an address before the Chicago Council on Foreign Relations, went into some detail regarding the history of the treaty.

"There is no dispute between the oil industry and the government, either as to our needs of access to foreign oil resources or as to the need of an international agreement on oil," he said, after citing various reports and statements of industry and congressional members and groups. "The only difference of opinion has been as to details of approach."

Ickes indicated that the negotiations with the British were the outgrowth of the abortive attempt of Petroleum Reserves Corporation to build the Arabian pipe line, "which did not fail to elicit interest in the United Kingdom." Since the line involved British interests, it was informally suggested that an understanding be reached, and the Anglo-American agreement was the result.

Ickes "Surprised"

Expressing surprise over the barrage of attack directed at the agreement, the administrator said that, "while he had not seen in it the evils found by the industry, he had suggested that the industry prepare its own recommendations, and they were adopted by the PIWC without a dissenting vote.

"Naturally," he said, "it is too early to say how fully the industry's proposed revisions will be accepted by the government and by the British. I can say, however, that there is no difference between government and industry on the question of preserving state rights, making the proposed international commission a purely advisory and recommendatory body, and avoiding anything that might even suggest a cartel.

"I think that we are on the way toward evolving an oil agreement that will be satisfactory to the petroleum industry and satisfactory to, and in the interest of, the general public. It will be necesary, of course, to submit any revisions to the British for their consideration, but I am hopeful that no serious objections will come from that direction."

Ickes' Oil Policy Views

The administrator summarized what he believes should be the oil policy of the United States.

"I believe that we need to encourage the exploration for oil domestically; that we should use wisely what we have; and that we should assure ourselves—lawfully and peacefully—of access to foreign oil resources. We should do this, so far as that is possible, through our tried and proven system of free private enterprise, with the government performing such functions as are in the general public interest.

"We need a policy of this kind—a positive, creative policy—because we need, and shall probably always need oil. Whatever the possibilities of synthetics, we still face the fact that the cheapest and best oil, so far, is natural oil. I want to be sure that we always have enough of it, where we can get it, when we need it."

Text of International Oil Treaty As Proposed by PIWC

FOLLOWING is text of the international agreement as proposed by PIWC:

PREAMBLE

The Government of the United States of America and the government of the United Kingdom of Great Britain and Northern Ireland, recognizing:

1. That ample supplies of petroleum, available for international trade to meet market demands, are essential for both the security and the economic well-being of nations;

2. That for the foreseeable future the petroleum resources of the world are adequate to assure the availability of such supplies; have decided, as a preliminary measure to the calling of an international conference to consider the negotiation of a multilateral petroleum agreement, to conclude the following agreement:

ARTICLE I

The signatory governments consider that the international petroleum trade should be conducted in an orderly manner within the framework of laws applicable thereto and of concession contracts and laws applicable to them. To this end, the signatory governments believe that the following objectives are of general applicability and merit voluntary adherence on the part of all countries interested in the international petroleum trade:

1. That, subject always to considerations of military security and to the provisions of such arrangements for the preservation of peace and prevention of aggression as may be accessible in international trade to the nationals of all countries on a competitive basis and without discrimination based on nationality.

2. That in making supplies of petroleum thus accessible in international trade the interests of producing countries should be safeguarded with a view to their economic advancement.

ARTICLE II

In furtherance of the policies embodied in this agreement the signatory governments will so direct their efforts:

1. That, with respect to the acquisition of exploration and development rights, the principle of equal opportunity shall be respected;

2. That all valid concession contracts and lawfully-acquired rights shall be respected and that no effort to interfere directly or indirectly with such contracts or rights shall be made;

3. That, subject always to the considerations mentioned in paragraph 1 of Article 8, the exploration for and development of petroleum resources, the construction and operation of refineries and other facilities, and the distribution of petroleum shall not be hampered by restrictions inconsistent with the purposes of this agreement.

ARTICLE III

With a view to the wider acceptance of the policies embodied in this agreement, the signatory governments agree that as soon as practicable they will propose to the governments of other interested producing and consuming countries an international petroleum agreement which would establish a permanent International Petroleum Council composed of representatives of all parties to the agreement.

To this end the signatory governments hereby undertake to formulate plans for an international conference to consider the negotiation of such an international petroleum agreement. They also undertake to consult with other interested governments with reference to the preparations for the proposed conference.

ARTICLE IV

There are numerous problems of immediate interest to the signatory governments with respect to the international petroleum trade which should be discussed on a cooperative interim basis.

With this end in view the signatory governments hereby agree to establish an International Petroleum Commission, four members of which will be appointed immediately by each of the signatory governments. To enable the commission to maintain close contact with the operations of the petroleum industry, each government will provide for full and adequate consultation with its nationals engaged in the domestic petroleum industry as well as with those engaged in the international petroleum trade.

This commission, in furtherance of and in accordance with the policies embodied in this agreement, shall consider problems of interest to the signatory governments and their national and shall be entrusted with the following duties and responsibilities with respect to the international petroleum trade:

1. To initiate studies of the problems of the international petroleum trade caused by dislocations resulting from war;

2. To initiate studies with respect to past and current trends in the international petroleum trade;

3. To initiate studies of the effects of changing technology in the petroleum industry upon the international petroleum trade;

4. To prepare periodic estimates of the world demands for petroleum and of the various supplies which may be available for meeting the demands, and to report concerning means by which such demands and supplies may be correlated so as to further the efficient and orderly conduct of the international petroleum trade;

5. To make, from time to time, such reports as may be appropriate to facilitate the realization of the purposes of this agrement and the wider understanding of the problems of the international petroleum trade.

The commission may regulate its own procedures and it shall establish such organizaiton as is necessary to carry out its functions under this agreement. The expenses of the commission shall be shared equally by the signatory governments.

The signatory governments will endeavor to assist the commission by making available to it such information as may be required for the efficient discharge of its duties and responsibilities.

The signatory governments will, as appropriate, consult with and seek the collaboration of the governments of other producing and consuming countries in connection with the functioning of the commission.

ARTICLE V

The signatory governments agree:

1. Unless the signatory governments decide otherwise in any particular case, all reports of the International Petroleum Commission shall be promptly published by each government. Upon such publication by a government, any action taken in compliance therewith shall not be deemed an infringement of its laws with reference to restraints of trade.

2. No provision in this agreement shall be construed to require a signatory government to act upon any report or suggestion made by the commission, or to require the nationals of a signatory government to comply with any report or suggestion made by the commission, whether or not it is published.

ARTICLE VI

The signatory governments agree:

1. No provision in this agreement shall be construed to apply to the operation of the domestic petroleum industry within either country.

2. No provision in this agreement shall be construed to prevent a signatory government from taking such action as it may desire to limit the amount of petroleum which may be imported into its country.

ARTICLE VII

The signatory governments agree that for the purposes of this agreement:

1. The word "country"

(a) In relation to the United Kingdom of Great Britain and Northern Ireland, means England, Scotland, Wales and Northern Ireland.

(b) In relation to the United States of America, means the continental United States including Alaska.

2. The word "nationals" means

(a) In relation to the United Kingdom of Great Britain and Northern Ireland, all British subjects belonging to the territory referred to in Paragraph 1 (a) of this Article, including companies incorporated under the laws of that territory.

(b) In relation to the United States of America, all nationals of the United States belonging to the territory referred to in Paragraph 1 (b) of this Article, including companies incorporated under the laws of that territory.

3. The word "petroleum" means crude petroleum and its derivaties.

ARTICLE VIII

This agreement is subject to ratification, and it shall enter into force on the exchange of ratifications. It shall continue in force until three months after notice of termination has been given by either signatory government.

In witness whereof the undersigned, duly authorized thereto, have signed this agreement.

New Draft Meets IPAA Objections, Brown Says

The new draft was seen as meeting the objections of the independent operators, Russell B. Brown, general counsel for the Independent Petroleum Association of America, stating that there is "substantial agreement" that the substitute has eliminated the objectionable features.

However, Brown said, members of the industry should have an opportunity to study the draft and prepare such criticisms they may have for submission to the Senate foreign relations committee if it becomes the subject of hearings.

Safety Award is Presented

For its good record in holding down accidents within its company, Standard Oil Company of California was recently given the National Safety Award by the National Safety Council. Harry B. Collier (left), president of Standard Oil Company of California, receives the award from Earl F. Campbell, Western Regional Manager, National Safety Council.

Anglo-American Oil Pact Withdrawal From Senate for Changes Seen Likely

Withdrawal from the Senate of the Anglo-American oil agreement submitted for ratification last August 24 and its revision to meet objections raised by the oil industry was definitely in the cards this week as a result of a blunt statement by Senator Tom Connally of Texas, chairman of the foreign relations committee, that he was opposed to its ratification.

Connally's statement was released as the oil policy committee of the PIWC met to draft a report for submission to the council, and was accepted generally as the final blow to the agreement as now written.

"The Anglo-American oil treaty now pending before the committee on foreign relations will, in my opinion, never be ratified by the committee," the Senator said. "It is my view that the treaty is unfair to the American oil industry and is not necessary for the general welfare. I have been opposed to ratification since it was first submitted to the committee."

Other leading figures in the Senate, among them Senators Wallace White of Maine, acting minority leader, and Senator McKellar of Tennessee, supported Connally.

The expression of Senate opinion, coming on the heels of vigorous opposition from the industry, left the administration in something of a quandary. Important as the arrangement under which international oil trade will be conducted after the war, the agreement is even more important as the pattern for other similar arrangements to be made with respect to rubber, sugar and various other commodities.

Administration officials agreed that the situation was delicate, admitting that President Roosevelt could not now withdraw the document as a treaty and put it into effect as an executive agreement without creating widespread criticism. Some method of dealing with the matter must be developed, it was said, and revision of the agreement appears to be the only feasible way.

The State Department was represented as perfectly willing to enter into new negotiations with the United Kingdom looking to a clarification of the pact to definitely set forth what it was asserted the negotiators had attempted to write—that the powers of the government will not be extended beyond their constitutional limitations, that the proposed commission will have no authority whatever and that the agreement will not apply to domestic oil domestically consumed.

To this end, it was said, the department will study closely the recommendations of the PIWC, which it was indicated will be the basis of any changes submitted to the British officially for concurrence.

Connally's statement evoked sharp editorial comment from the Washington *Star* and Washington *Post* which, while entering no defense of the agreement as now written, criticised the committee chairman for acting before holding hearings at which government officials and industry representatives could present their facts and views and the whole matter thoroughly aired.

E. B. COX, 48, a member of the engineering department of Shell Oil Company, in Houston, died December 7. He was the organizer of the Ten-Year Club of Shell and was its president for the past 10 years.

Mergers Provided as PAW Set-up Is Revamped

Revamping of the PAW set-up, splitting the construction division into two groups to be merged, respectively, with the refining and materials division, was announced by Deputy Administrator Davies December 6. No reduction in personnel is involved in the shift.

George Gibson, director of the construction division, becomes PAW's construction officer and continues as vice chairman of the PAW facilities review committee. He will serve all domestic and foreign operating divisions and will be directly responsible for the completion of the 100-octane construction program and other urgent domestic refining construction programs.

M. B. Fitzgerald, formerly assistant director, will be in charge of the new construction section of the refining division, and Leo Connell will go to the materials division as assistant director in charge of a new equipment scheduling and special ratings section.

To conform to the new headquarters organization, the five district industry construction committees will be liquidated and their functions assigned to the refining and materials committees.

"The construction division has done a remarkable job in directing and assisting in the construction of gasoline plants now turning out more than 500,000 barrels a day of aviation gasoline," Davies said in commenting upon the reorganization. "Most of this PAW-sponsored construction program is completed, but our work is not yet done; in fact, with the stepped-up air offensive on a world scale, the 100-octane program has entered an especially critical stage.

"The task of the Paw's construction and refinery experts now is to determine the refiners' needs and to obtain prompt delivery of the equipment necessary to break bottlenecks in production, improve the quality of the gasoline, and increase the output of critical components such as tetraethyl lead. The new organizational arrangement is designed to serve this purpose."

Bruce Brown Resigns as PAW Deputy Administrator

PAW last week lost another of the top-flight executives who helped put over its war program when Bruce K. Brown resigned as assistant deputy administrator to return to Standard Oil Company (Indiana) as general manager of research and development with headquarters in Chicago.

Brown's resignation evoked expressions of appreciation of his work from both Administrator Ickes and Deputy Administrator Davies, the latter commenting upon the meager compensation which the government affords the highly paid executives who participate in the war effort.

Announcing Brown's resignation, Ickes said he "can leave the government service with the knowledge that his work in PAW has been valuable in the prosecution of the war. It is with the greatest reluctance that I accept his resignation."

Another of the higher executives will leave the oil agency in the near future, when Meade McCamey, assistant director of the materials division, returns to private industry.

House Small Business Committee Criticizes OPA's Oil Procedure

Charging that the Office of Price Administration is driving the independent oil producer out of business and developing a trend toward monopoly, the house committee on small business last week called for an immediate survey of finding, developing operating costs, to be made and completed by OPA within 90 days.

While not directly charging the price agency with dilatory tactics and with relying on obsolete and insufficient statistical data, the committee criticized it for not giving sufficient attention to the need for inclusion of amortization of exploration costs in current price ceilings on crude oil.

"There is a definite indicated need for the immediate initiation of an up-to-date study which will show the present operating costs of the independent oil producers," the committee said in an interim report released December 4.

"This study should be based upon attested figures submitted to the OPA upon a uniform cost form. Due to the great number of firms engaged in crude oil production, the study should not attempt to include reports from all firms in the industry. Instead, the same procedure should be used as was used in the recent study of costs in the southern pine lumber industry wherein a limited number of firms were selected by mutual agreement between officials of the OPA and representatives of the industry.

"At the present time, OPA is not inclined to segregate the costs of the low-cost, flush well producers from the costs of the more expensive stripper well operators in their over-all consideration of alleged unfairness of the national level of crude petroleum prices. When it is considered that the bulk of the low-cost flush well operators are owned by the major integrated companies, with the independents' interests being largely confined to the higher cost wells, it is apparent that any survey which is made should take this fact into account and should segregate the findings to that extent.

"If the results of a survey show that the price of crude petroleum should be raised, the price of petroleum products should not be raised to the consumer. Instead, if necessary, a subsidy should be granted the marginal cost refiner whose profits might be adversely affected by an increase in the price of crude oil."

The committee emphasized that price increases should not be granted to individual producers in a given pool, because of the impracticability of such a method from a marketing standpoint, but should be on a nation-wide basis and of such extent as to "permit all producers whose operations are conducted in a normal and efficient manner to make a fair profit on their production operations."

Crude Oil Production in the United States

(Estimates compiled by The OIL WEEKLY. All figures indicate daily averages, in barrels.)

State or District	PRODUCTION IN WEEK ENDED December 9	December 2
Alabama	250	250
Arkansas	80,100	80,300
California	885,500	885,000
Colorado	8,150	9,350
Florida	50	50
Illinois	203,300	193,400
Indiana	13,050	13,350
Kansas	267,350	265,250
Kentucky	31,700	29,400
Louisiana	361,950	363,650
North	72,300	72,350
South	289,650	291,300
Michigan	47,700	47,800
Mississippi	48,050	48,850
Missouri	100	100
Montana	23,340	22,470
Nebraska	1,050	1,000
New Mexico	105,700	105,750
New York	13,500	13,250
Ohio	8,150	7,100
Oklahoma	360,350	359,900
Pennsylvania	38,350	35,400
Tennessee	35	35
Texas	2,111,550	2,132,300
Upper Gulf Coast	552,900	553,350
East Texas Field	371,000	367,950
Rest of Eastern Texas	141,450	144,600
Lower Gulf Coast	246,450	247,600
Southwest Texas	79,000	79,300
South Central Texas	20,100	20,150
West Texas	471,300	473,950
North Texas	140,600	151,200
Panhandle	88,750	94,200
West Virginia	8,100	8,100
Wyoming	94,500	96,950
Total United States	4,711,875	4,719,005

Program for Oil Compact Meet at Jackson Listed

Oil and gas development in Mississippi, Alabama, Georgia, and Florida and the utilization of the natural resources of the south will feature the program of the Interstate Oil Compact Commission at Jackson, Mississippi, December 15 and 16.

Governor Thomas L. Bailey of Mississippi will welcome the commission and the response will be by Governor Robert S. Kerr of Oklahoma. Talks by the following state geologists, W. C. Morse of Mississippi; Stewart Lloyd of Alabama; Garland Peyton of Georgia; and Herman Gunter of Florida, are scheduled.

On Saturday, William Boyd, Jr., chairman, Petroleum Industry War Council, Washington, and Dr. John J. Grebe, director of physical research, Dow Chemical Company, Midland, Michigan, will speak.

Officers will be elected, standing committees appointed, and plans for the ensuing year will be formulated Saturday.

Alcohol-for-Rubber Demand Will Be Cut Back Sharply

Requirements for industrial alcohol for the manufacture of synthetic rubber will be cut back sharply next year as the petroleum-base plants reach maximum production, the War Production Board has disclosed.

The latest estimate indicates that 228,000,000 gallons of alcohol will be required for the rubber program, against a consumption this year of 329,200,000 gallons, and the proportion of the national supply used for that purpose will decline from its present more than 50 percent to approximately 40 percent.

Much of the alcohol thus released will go into what is known officially as "beverages."

API Reelects Officers and Approves PIWC Oil Treaty

Present officers and directors of the American Petroleum Institute were re-elected for another term at the annual meeting of the API board at which the full support of the association was thrown behind the revised oil treaty proposed by the PIWC.

Meeting on the heels of the monthly session of the council, the board devoted much of its relatively brief session to a discussion of the treaty, regarding which it passed a resolution adopting the views of the PIWC as its own.

The resolution set forth the opinion of the board that the government should establish and maintain a consistent foreign oil policy:

"By giving necessary and legitimate diplomatic supply under the principles of international law, to its nationals engaged in foreign oil operations;

"By fostering the private enterprise of its nationals in foreign exploration, production, transportation, refining and marketing of petroleum and its products;

"By the establishing as a cardinal principle in such foreign oil policy of the government of the United States that the government itself will not directly or indirectly engage in foreign oil ownership, exploration development, or operation, either in its sovereign or proprietary capacity, or through the media of ownership in corporations or other agencies engaged in the petroleum industry; and

"By creating an international instrument of consultation and collaboration, without power of enforcement and in which there is joint government-industry representation, as essential to further world oil developments on a basis of mutual respect."

The August 8 agreement developed by the State Department, the resolution declared, is in conflict with those principles.

Officers reelected were: president, W. R. Boyd, Jr.; vice president of production, George A. Hill, Jr.; vice president of refining, J. Howard Pew; vice president of marketing, E. V. Weber; treasurer, O. D. Donnell; secretary and assistant treasurer, Lacey Walker.

Elk Hills Oil Production Now 40,000 Barrels Daily

Production from the Elk Hills naval reserve has reached 40,000 barrels a day, it was disclosed by the Navy Department December 7 with release of a congratulatory telegram to Standard Oil Company of California, which is handling the accelerated drilling program.

The present production represents an increase of 25,000 barrels daily over the amount produced last summer and marks the half-way point to consummation of the department's objective of 65,000 barrels a day.

Seanson Succeeds Steele

Jack W. Steele, acting director of the petroleum conservation division and chairman of the Federal Petroleum Board, has resigned due to ill health and personal plans.

Edward B. Seanson, formerly associate director of the conservation division, has been named acting director to succeed Steele.

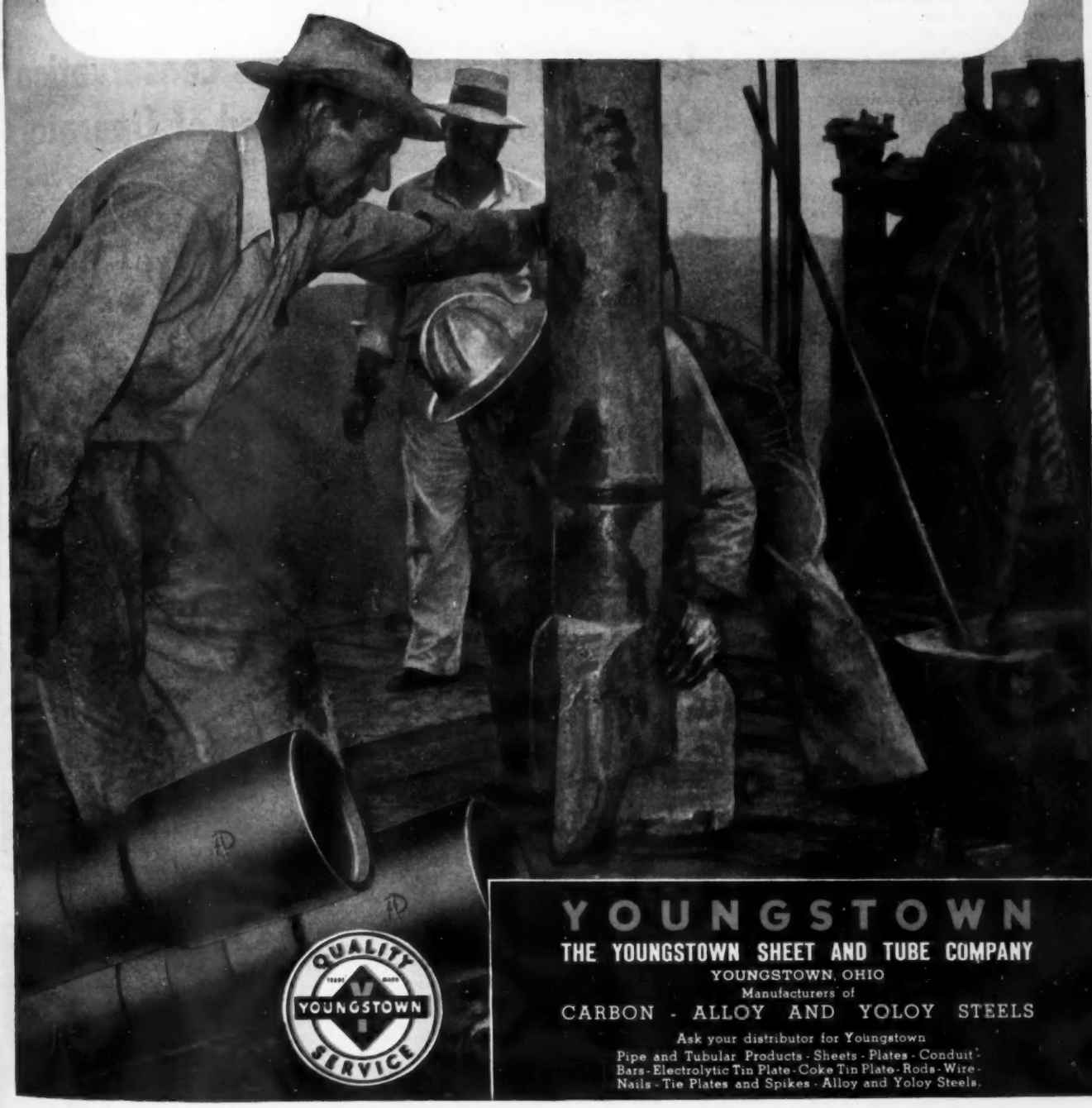
Youngstown Salutes the "ROUGHNECKS" of America

THERE are no "E" Flags flying from these derricks, but "For Excellence in Production" Youngstown salutes the "Roughnecks."

Oil is ammunition, and the "Roughnecks" are the boys who are passing it along. "Making hole" today is vital war work, just as important as making a hole in an Axis tank or plane.

The "Roughnecks" who are sweating it out in the oil fields, racking up Youngstown pipe or running Youngstown casing have earned the thanks of the nation. They not only have added to our oil supply, but have set an example to other war workers by their hard and uninterrupted work, night and day, holidays and Sundays.

For hard working oil field men, Youngstown tubular goods provide good, reliable performance year after year. For more than forty years, in war and peace, Youngstown has served the oil industry, with constantly improving products, identified by the orange band markings.



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Attempt to Break State Department Aloofness Seen in New Appointees

A thorough reorganization of the State Department, the second within a year, was initiated last week by President Roosevelt when, after appointing Edward R. Stettinius as successor to retiring Secretary Cordell Hull, he replaced three assistant secretaries with men who have served him in other capacities during the past four years.

The reorganization was seen in Washington as a means of breaking the traditional aloofness of the department from the actual realities of current world developments and pave the way for the enlarged responsibilities which it will have in the postwar era.

Although he staunchly supported Secretary Hull through the long years of his service as Secretary of State, the President lost no time in so manning the department as to center the mainspring of diplomatic policy in the White House.

Three Appointees

The new assistant secretaries are William H. Clayton, hard-hitting Texas cotton merchant who recently resigned as administrator of surplus war properties; Nelson Rockefeller, earnest young millionaire grandson of the late John D., who has been coordinator of Inter-American affairs, and Archibald MacLeish, liberal poet and former head of the Office of Facts and Figures, who resigned a life-time job as Librarian of Congress to accept a position with less salary and no security of tenure.

Over them will be Joseph C. Grew, career diplomat who, in nine years as ambassador to Tokyo, became one of the leading authorities on Japan, who was appointed undersecretary to fill the post formerly held by Stettinius.

Important in themselves because they bring a new type of men into the department, the appointments are merely the first step in a program to build it into an organization going far beyond the concepts of Secretary Hull, who was averse to imposing upon the department operational responsibilities beyond those necessary for its administration.

Under that program, the permanent activities of the coordinator of Inter-American affairs will be taken over after the end of the war in Germany, and much of the foreign work of the Office of War Information and the foreign trade functions of the Commerce and Treasury Departments and other agencies may be transferred to the State Department, as well as functions of the Foreign Economic Administration that can be projected into the postwar period.

Division of Work

The three new assistant secretaries will divide important functions among themselves. Clayton will be in charge of foreign economic affairs, Rockefeller will handle Latin-American relations and MacLeish is expected to handle a projected program to educate the country in the objectives of our foreign policy.

These changes in department personnel and policy may be of special importance to the petroleum industry because of the fact that oil will be a major matter for diplomatic and business dealings in the Middle East and elsewhere and because of the current situation with respect to the Anglo-American oil agreement.

Darlington Back

The reorganization so far has not involved the petroleum activities of the department and as a matter of fact, the petroleum division, last week, was given its first chief with the release by the Navy of Lieutenant Commander Thomas Darlington to take that post. Darlington was formerly with General Motors Export Corporation and at one time was connected with the old trade agreements section of the department. Since the division was set up it has been directed by James C. Sappington, assistant, as acting chief.

Use of Magnesium Anodes Cited at Dow Meeting

Results obtained at Dow Chemical Company's Midland, Michigan, and Freeport, Texas, plants were discussed in a Houston meeting December 6 and 7 of pipe line, corrosion, telephone and telegraph, smelting and chemical engineers.

H. A. Robinson of Dow's physical research department discussed recent developments in the use of magnesium to combat corrosion in the employment of anodes; Y. W. Titterington, Dow engineer at Freeport, spoke on the use of magnesium anodes on underground pipe lines in the area of the Freeport plant; Hugo Wahlguist of Ebasco Service Company gave a talk on the use of zinc and magnesium anodes; and M. C. Miller of Ebasco conducted the open discussion.

A field trip was made to view an installation where magnesium anodes were used in cathodic protection. On the following day the group visited the Freeport plant to study cathodic protection installations.

Texas Rail Group Plans Gas Conservation Conference; Data Requested of Operators

An informal conference to discuss Texas gas problems has been scheduled by the Texas Railroad Commission to follow the statewide hearing December 19.

In a prepared statement, Railroad Commissioner Beauford Jester said the commission would seek information to assist in gas conservation. Data on casing head gasoline production and recycling and repressuring plants are to be brought in by the operators.

"The best method of conservation of gas which may be appropriate for each individual oil or gas field can be determined by a hearing on that particular field," Jester declared.

"After due notice to all parties concerned a hearing will be called on each principal gas producing field in Texas.

"At these hearings the reservoir characteristics and reservoir behavior of each field will be given consideration and appropriate action taken to conserve the natural gas produced with oil.

"Too much gas has been wasted in the past because it had no market and consequently no sale value.

"Now that a good market has developed for natural and casing head gas it would seem proper to now ask the operators to show cause why all gas should not be fully utilized.

Vented Gas First

"One immediate result expected is that all vented gas within reasonable distance of gas pipe lines should be taken by these pipe lines before any gas is taken from a gas field for the line.

"In deeper high pressure condensate fields there is presented a problem of retrograde behavior in the reservoir.

"Because any appreciable drop in reservoir pressure in reservoirs of this type will result in condensation of heavy hydrocarbons, the problem of conservation becomes twofold—that is, to realize the maximum ultimate recovery of both light and heavy hydrocarbons.

"Recent tests have shown some fields with reservoir pressures only 100 to 150 pounds per square inch higher than the dew points of the reservoir gases.

"Thus it will be seen that we are at a critical point in some fields and immediate action must be taken to prevent a drop in pressures to avoid an irrecoverable loss of liquid hydrocarbons through condensation in the reservoir.

"We intend to stop this loss and prevent this waste wherever possible."

Information Asked

The following information concerning casinghead operations was requested from all operators:

Total casinghead gas produced; average gas-oil ratio for the field from which you provide oil; amount of casinghead gas that goes to casinghead plants; amount of casinghead gas that is returned to leases from casinghead plants; amount of casinghead gas used for gas lift; amount of casinghead that goes to pipe lines; amount of casinghead that goes to carbon black plants; amount of casinghead gas that is used for repressuring purposes; amount of casinghead gas that is used in the field; amount of casinghead gas vented in the field.

Operators of recycling and repressuring plants are required to present the following data:

Capacity of plant; amount of in-take gas; amount of out-put gas; extraction loss; amount of gas returned to the formation; amount of gas that goes to pipe lines; operating pressures; liquid recovery per million cubic feet; a flow sheet or diagram showing the total gas coming into the plant and the total amount going out of the plant.

SAMUEL BRISCOE, 81, superintendent of the claims and right-of-way department of Stanolind Pipe Line Company until his retirement in 1939, died at Tulsa December 5. A native of Iowa, he entered the gas business as secretary of the Hartford City Natural Gas Company and was later affiliated with the Prairie Oil & Gas Company, the Oklahoma Pipe Line Company and Sinclair Pipe Line Company.

THE OIL WEEKLY'S
International Number

THE OIL WEEKLY presents herewith a summary of oil operations outside of the United States. The foreign oil picture has changed materially since the start of the war, despite global shortage of equipment. Many countries, notably Venezuela, the Near East nations, and Russia, have increased their producing rates sharply, and are expected to continue to do so after the war. Therefore, foreign countries are going to have a greater influence on the international oil situation.

A complete World Oil Atlas, showing location of producing fields, pipe lines and refineries in all countries outside of the United States, feature this issue. The Atlas section, which commences opposite page 128, presents for the first time in history a collection of especially drafted world oil maps. Months were spent in obtaining the necessary data, then months of drafting by a professional map maker. In true Atlas style, individual colored maps are published of every oil producing country.

Most of the articles and data presented in the issue were prepared by Don L. Carroll of THE OIL WEEKLY's New York office and by L. J. Logan of THE OIL WEEKLY's Houston office; although several other members of the editorial staff gave valuable assistance.

World Oil Industry Looks Ahead to a Busy Future

REGARDLESS of the uncertain dates when victory will be achieved in Europe and Asia, the world oil industry, largely the enterprise of the United Nations, must continue to operate and plan on the basis of supplying great and expanding demand for petroleum products. And this is the course that the industry actually is pursuing.

Despite myriad handicaps, it is turning out more oils in 1944 than it ever did before, is anticipating that it may be called upon for still larger quantities in 1945, and at the same time is laying and, as far as possible, executing plans to supply even greater requirements for oils fairly early in the postwar period.

For the industry not only has a vital role in the prosecution of the war against the aggressor nations but also must shoulder heavy responsibility in building the better postwar world, by dispensing generously over the earth the benefits of the resources of which it is custodian.

Toward this end many leaders of the industry are earnestly directing their thought and effort, while at the same time recognizing that the industry cannot achieve maximum fulfillment of its postwar responsibility unless it is accorded the necessary political conditions and adequate economic freedom.

Oil's Contribution

Granted these conditions, the oil industry, through its resourcefulness and initiative, can be counted upon to make a very great contribution toward the prosperous and happy peace which is regarded as one of the strongest possible forces to discourage future wars.

In the planning for the immediate as well as the postwar future, all sections of the globe have received the attention of the industry, and it is evident that the whole industry henceforth will be much more world-minded than it was before the war. All nations have been made more cognizant of the great strategic and economic value of petroleum, and there is in prospect a great intensification of efforts to find and own reserves in new areas throughout the earth. Many regions hitherto unexplored or superficially tested will be given thorough exploration, and out of that work will come much important new production to influence the world markets for oil. The developments may be expected to have varying effect on different producing nations, but out of them will come greater consumption, benefiting especially the countries deficient in domestic reserves, of which most of those in Europe are examples.

Two Promising Areas

Already, there is in prospect a far-reaching alteration of the prewar oil marketing picture through the development now under way or planned in the Caribbean area and the Middle East. Those two areas of rich reserves have both played prominent roles in world oil affairs in 1944, and they can be expected to offer far-reaching developments also in the postwar period. Insofar as they may establish for themselves relatively higher positions as producers of oil, they may bring the United States down materially from its position heretofore as supplier of around 65 percent of world production. However, this is not necessarily so, as United States consumption also has been around that percentage of the world total, and both production and consumption will continue relatively high.

In any event, as leading exporting areas, the Caribbean area and the Middle East will compete keenly for the markets in western Europe, the foremost importing region, which both can serve economically.

The Caribbean area at least temporarily will have the advantage of larger established facilities of production and refining, production in Venezuela alone being already above 800,000 barrels daily and due to be expanded above 1,000,000 daily, while Colombia expects to produce 80,000 barrels daily in 1945.

In the Middle East, production will be expanded to around 500,000 barrels daily through additional refining facilities now being completed on the Persian Gulf and the eastern end of the Mediterranean, but plans are seriously contemplated for increasing refining and production to more than 1,000,000 barrels daily after the war, such a producing potential being already available. By comparison, the United States produced and processed around 4,500,000 barrels per day in 1944.

The contemplated expansion in the Middle East, if carried out will require the construction of the additional refining capacity and may involve much laying of large pipe lines. Even if the pipe lines are not built, the increase of production and refining can be undertaken, because tankers, of which there will be many after the war, can be used to solve the transportation problem, carrying oils around Arabia and through the Suez Canal. Comparatively little drilling will be necessary in the established rich fields for several years. However, much exploratory examination and drilling doubtless will be carried out henceforth, to gain more information on the highly promising unexplored areas. Large areas remain open for granting concessions, and bidders of several nations are competing against each other for them.

In the Caribbean area, too, there are many promising prospects that oil companies will want to drill, and in spite of the expansion which has taken place this year, addtional pipe line building and refinery expansion remain to be completed, while numerous fields are only partly developed. Competition is keen in bidding for concessions, especially in western Venezuela.

Aside from the emergence of the Near East and Venezuela-Colombia as more important producing areas, the especially significant developments of the war period have included those in the United States and Russia. Whereas the Middle East will have large producing potential in excess of actual production even after any expansion of the near future, while the Caribbean area also will have some surplus, the United States has pushed production to the limits of efficient production of its established reserves and henceforth must endeavor to build up reserves. In the heavy wartime drain on United States fields, while drilling has been sub-normal for three years, the country's production was stepped up until, in 1944, it was greater than the output of the whole world as recently as 1935. Oil industry leaders are confident that with the return of peacetime conditions, United States reserves will be adequately expanded. But oil-finding possibilities are conceded to be less attractive than in the Near East and a few other areas. Consequently, for several years at least, the United States may be expected to be concerned primarily with building up American-controlled reserves, domestic and foreign, rather than in competing for world markets. And unless results are favorable, the prospects of importing susbtantial volumes of oil will increase.

Russia Developing

The significant development in Russia has been the reported noteworthy success in establishing new reserves in the "Second Baku" area, between the Urals and the Volga. Much of the Soviet oil industry has been shifted to that region, beyond the easy reach of present or potential enemies, and the country is confident of maintaining indefinitely its independence of foreign oils, although it probably has no intention of developing any substantial production for export. On the contrary, the Soviet Union this year exhibited interest for the first time in going beyond its own borders to develop oil reserves. It negotiated for concessions in northern Iran below the Caspian Sea, although Iran's response was to postpone until after the war the granting of concessions in any part of the country. Russia currently holds about 11 percent of world crude reserves and also accounts for about 11 percent of world production of crude, these situations being about the same as those for South America. In contrast, the Near East holds nearly a third of world reserves and has been producing only about 6 percent of total world production; while the United States holds about 40 percent of reserves and is producing about 65 percent of world output.

Outside the above discussed major oil producing areas, there have been numerous interesting if not quite such important development, and future development will be of at least local importance.

In South America, Argentina and Bolivia remain dependent on imports to supplement domestic production, despite

Trends of Crude Oil Production By Countries

Sources: Minerals Resources and Minerals yearbook, except as otherwise noted.

Continent and Country	ANNUAL PRODUCTION—(Thousands of Barrels)							Daily Average Production (Barrels Daily)			Percent Change in Daily Average Production		Year's Production as Percent of World Total		Cumulated Prod. Through 1944	
	1938	1939	H1940	H1941	K1942	K1943	K1944	1938	1943	1944	'38-44	'43-44	1943	1944	Thousand Barrels	Percent of World Cum. Prod.
North America																
Canada	6,966	7,838	L8,718	10,124	L10,363	L10,028	10,000	19,085	27,474	27,322	+ 43.2	— 0.6	.44	.38	105,074	.21
Mexico	38,506	42,898	44,036	42,895	L34,716	L34,890	36,000	105,596	95,589	98,361	— 6.9	+ 2.9	1.53	1.38	2,139,551	4.58
Trinidad	17,737	19,270	20,219	21,211	N24,500	25,000	25,000	48,594	68,493	68,306	+ 40.6	— 2.7	1.10	.95	297,494	.68
United States	1,214,355	1,264,962	1,353,214	M1,402,228	M1,386,645	1,503,176	1,678,264	3,327,000	4,118,290	4,585,420	+ 37.8	+ 11.3	65.97	64.01	29,776,731	63.89
Others	78	112	142	150	150	200	200	214	548	547	— 155.6	— 0.2	.01	.01	1,225	.00
Total N.A.	1,277,642	1,335,080	1,426,329	1,476,608	1,456,374	1,573,294	1,749,464	3,500,389	4,310,394	4,779,956	+ 36.5	+ 10.9	69.05	66.73	32,320,075	69.36
South America																
Argentina	17,076	18,613	20,609	22,013	L23,742	P24,836	24,200	46,784	68,044	66,120	+ 41.3	— 2.5	1.09	.92	320,433	.69
Bolivia	226	215	288	230	250	250	425	619	685	1,161	+ 87.6	+ 69.5	.01	.02	2,671	.01
Colombia	21,582	23,857	25,593	24,553	10,590	P14,900	23,500	59,129	40,822	64,208	+ 8.6	+ 57.3	.65	.90	351,031	.75
Ecuador	2,246	2,313	2,349	1,557	P2,350	P2,500	2,500	6,153	6,849	6,831	+ 11.0	— 0.2	.11	.10	33,739	.07
Peru	15,839	13,508	12,126	11,922	N13,500	15,700	21,000	43,395	43,014	57,377	+ 32.2	+ 33.4	.69	.80	326,157	.70
Venezuela	188,174	206,470	185,570	223,784	N145,000	180,000	267,000	515,545	493,151	729,508	+ 41.5	+ 47.9	7.90	10.18	2,890,087	6.20
Others	.....	.....	.....	3	30	40	50	.....	109	137	.....	+ 25.7	.00	.00	123	.00
Total S.A.	245,143	264,976	246,535	284,062	195,462	238,226	338,675	671,625	652,674	925,342	+ 37.8	+ 41.7	10.45	12.92	3,924,241	8.42
Europe																
Albania	752	934	1,497	1,381	1,450	1,100	S	2,060	3,014	.....	.....	.....	.05	.....	8,068	.01
Czechoslovakia	130	120	119	109	120	125	125	356	343	341	— 4.2	— 0.6	.01	.01	3,036	.06
England	F	F	R125	R300	500	600	670	F	1,644	1,831	.....	+ 11.4	.03	.02	2,215	.00
France	513	500	496	479	500	600	500	1,406	1,644	1,366	— 2.8	— 16.9	.02	.02	13,243	.02
Germany	3,861	4,487	4,544	4,438	P7,200	P7,500	7,000	10,578	20,548	19,126	+ 80.8	— 7.0	.33	.27	76,495	.16
Austria	383	693	719	692	P6,200	P6,800	6,000	1,049	18,630	16,393	+1,462.7	— 12.0	.30	.23	21,802	.04
Hungary	288	1,103	1,755	2,474	P5,500	P8,200	7,500	789	22,466	20,492	+2,497.2	— 8.8	.36	.29	26,836	.05
Italy	101	91	57	46	P80	P60	40	277	164	109	— 60.6	— 33.5	.00	.00	2,993	.00
Poland	3,763	3,898	3,891	3,319	N3,400	3,500	3,500	10,310	9,589	9,563	— 7.2	— 0.3	.15	.13	276,514	.59
Roumania	48,487	45,483	42,182	38,147	P38,000	P36,000	20,000	132,841	98,630	54,645	— 58.8	— 44.6	1.58	.76	1,046,140	2.24
U.S.S.R. (Russia)	204,956	216,866	218,600	238,150	N212,000	240,000	275,000	561,523	657,534	751,366	+ 33.8	+ 14.3	10.53	10.49	5,370,539	11.52
Others	9	10	10	10	10	10	10	25	27	27	+ 8.0	.....	.00	.00	76	.00
Total Europe	263,243	274,185	273,995	289,545	274,960	304,495	320,345	721,214	834,233	875,259	+ 21.4	+ 4.9	13.36	12.22	6,847,957	14.69
Africa																
Egypt	1,581	4,666	6,053	7,659	P8,190	P8,994	9,000	4,331	24,641	24,590	+ 467.8	— 0.2	.40	.34	78,205	.17
Algeria	F	F	F	F	F	F	F	F	.....	.....	.....	.....	.....	.....	143	.00
Others	27	27	27	27	25	25	25	74	69	68	— 8.1	— 1.4	.00	.00	213	.00
Total Africa	1,608	4,693	6,080	7,686	8,215	9,019	9,025	4,405	24,710	24,658	+ 459.8	— 0.2	.40	.34	78,561	.17
Asia																
Bahrein Island	8,298	7,589	7,074	6,794	N7,800	8,000	8,750	22,734	21,918	23,907	+ 5.1	+ 9.1	.35	.33	68,293	.15
Burma	7,538	7,873	7,731	7,762	P1,150	P750	1,000	20,652	2,055	2,732	— 86.8	+ 32.9	.04	.04	56,421	.12
India, British	2,488	2,327	2,250	2,270	N2,500	3,000	3,000	6,816	8,219	8,197	+ 20.3	— 0.3	.13	.12	267,919	.57
Iran (Persia)	78,372	78,151	66,900	78,000	N76,000	78,000	102,000	214,718	213,699	278,689	+ 29.8	+ 30.4	3.42	3.89	1,350,832	2.90
Iraq	32,643	30,791	24,225	12,650	P17,442	P26,266	33,000	89,433	71,962	90,164	+ 0.8	+ 25.3	1.15	1.26	279,701	.60
Japan (Incl. Taiwan)	2,511	2,654	2,639	3,300	N3,400	3,500	3,500	6,879	9,589	9,563	+ 37.6	— 0.3	.15	.14	96,550	.21
Netherland India	57,318	62,087	62,011	62,120	N9,000	20,000	35,000	157,036	54,794	95,628	— 39.1	+ 74.5	.88	1.33	1,102,807	2.37
Sakhalin	3,821	4,000	4,000	4,000	5,000	5,000	5,500	10,469	13,698	15,027	+ 43.5	+ 35.9	.22	.21	55,740	.12
Br. Borneo (Sarawak & Brunei)	6,913	7,097	7,047	6,864	N1,500	3,000	5,500	18,940	8,219	15,027	— 20.7	+ 82.8	.13	.21	118,032	.25
Saudi Arabia	495	3,934	5,365	5,871	P4,530	5,475	6,000	1,356	15,000	16,394	—1,109.0	+ 9.3	.24	.23	31,755	.07
Other	.....	.....	.....	3	.....	Q750	Q900	.....	2,055	2,459	.....	+ 19.7	.03	.03	1,650	.00
Total Asia	200,397	206,503	189,242	189,631	128,322	153,741	204,150	549,033	421,208	557,787	+ 1.6	+ 32.4	6.74	7.79	3,429,700	7.36
Australia and New Zealand	4	3	3	3	5	25	50	11	69	137	+1,145.4	+ 98.5	.00	.00	107	.00
World Undistributed	4	4	14	14	15	25	25	11	68	68	+ 518.2	.....	.00	.00	1,123	.00
World Total	1,988,041	2,085,444	2,142,198	2,247,549	2,063,353	2,278,825	2,621,734	5,446,688	6,243,356	7,163,207	+ 31.5	+ 14.7	100.00	100.00	46,601,764	100.00
Data by Global Units:																
W. Hemisphere	1,524,393	1,604,749	1,678,944	1,768,356	1,660,051	1,820,539	2,097,164	4,176,419	4,987,778	5,729,956	37.2	14.9	79.89	80.00	36,322,877	77.94
Europe, incl. U.S.S.R.	263,243	274,185	273,995	289,545	274,960	304,495	320,345	721,214	834,233	875,259	21.4	4.9	13.36	12.22	6,847,957	14.70
Middle East	119,808	120,465	103,564	103,315	105,772	117,741	149,750	328,241	322,579	409,154	24.7	26.8	5.17	5.71	1,730,581	3.72
Far East	80,589	86,038	85,678	86,316	22,550	35,250	53,500	220,792	96,574	146,174	33.8	51.4	1.55	2.04	1,697,469	3.64
Others	8	7	17	17	20	800	975	22	2,192	2,664	12,009.0	21.5	.03	.03	2,880	.00
Total	1,988,041	2,085,444	2,142,198	2,247,549	2,063,353	2,278,825	2,621,734	5,446,688	6,243,356	7,163,207	31.5	14.7	100.00	100.00	46,601,764	100.00

F No more data available. H All figures for 1940 and 1941, except as footnoted, from U.S.B. of M.'s "International Petroleum Trade", March 31, 1942. K 1942,1943 and 1944 estimated by The Oil Weekly, except as footnoted. L Government Sources. M Revised B. of M. figure. N A.I.M.E. Transaction, 1943. P P.I.W.C. report, April 5, 1944. Q Estimate for China. R Oil Weekly estimate. S Probably very little produced.

some wartime development of their government-operated industries, while Peru has steadily expanded production during the war period to a new high in 1944, being a substantial exporting nation. Ecuador has maintained production above 5000 barrels daily during the war period, despite the lack of new discoveries. Mexico remains an exporting country and in 1944 has somewhat increased production from the wartime low of the tanker shortage period, but it is forecast that producing potential will decline below domestic consumption within a few years unless the government-operated industry begins finding new reserves.

Canada imports a high proportion of her requirements but has extensive areas where good fields may be found, and the present relatively large amount of prospecting in the western, northwestern, and eastern portions of the country conceivably may lead eventually to the building up of production equaling domestic needs. Canol and related projects have stimulated interest in northern Alaska and Northwestern Canada.

Wartime search for new oil fields has extended across the Pacific to Australia and New Zealand, in the effort to develop convenient supply for that theatre of war. But results have been disappointing. Australia has yielded no commercial production, and New Zealand so far has only one field with several wells.

In the Far East, Japan still controls most of the oil industry, and is conceded to have had some success in re-developing the important East Indies properties taken by conquest from the Dutch and the British, after the owners had largely destroyed refineries and wells. Rehabilitation of those properties after defeat of the Japanese will be an important job in the reconstruction period.

Principal development in Europe has been the partial destruction of the industry in Roumania this year by the attacking United Nations and the withdrawing Germans. There, too, an important reconstruction task is in prospect.

Under the heavy demands of war, world production of crude oil in 1944 will reach an unprecedented total of approximately 2,621,734,000 barrels, an average of 7,163,000 barrels daily. That is 14.7 percent more than daily average output in 1943 and exceeds the production rate in 1938, last prewar year, by 31.5 percent.

Control of World Oil Reserves Certain To Be Important Postwar Factor

Location of actual petroleum resources to have heavy influence on worldwide economy. Proved reserves variously estimated between 50 and 61 billion barrels with Near East in favorable position with 30 percent of total. North American reserves placed at 41 percent with United States holdings predominant.

THE world's supply of proved petroleum reserves is estimated at 50 to 61,000,000,000 barrels. An average of four computations, presented in an accompanying table, is 54,000,000,000 barrels. The spread of more than 9,000,000,000 barrels between the low estimate of 50,000,000,000 and the high of 61,000,000,000, gives opportunity for a conservative or liberal interpretation of world reserves.

The Petroleum Administration for War, with one of the most conservative estimates of reserves, sets the world figure at 50,701,000,000 barrels. In the October, 1944, issue of the Bulletin of American Association of Petroleum Geologists, G. C. Gester gives a conservative estimate of 51,095,521,000 and an optimistic estimate of 61,384,100,000 barrels.

Hitting near an average between PAW's total and Gester's optimistic figure, Ernest O. Thompson, of the Texas Railroad Commission, puts world reserves at 54,992,600,000 barrels. The actual average of the four estimates is 54,293,505,000 barrels. Also included in the table is an estimate presented by V. R. Garfias and R. V. Whetsel before the American Institute of Mining and Metallurgical Engineers. It does not show figures for all countries, but is included to show the range of various estimates for the more important countries.

Whether the low, average or high figure is taken is not a matter of great importance because all estimates are in general agreement, and any estimate of reserves may err by several billion barrels. Also, experience has shown that reserve figures must be revised periodically, usually upward, to conform to additional exploratory developments.

North American Output

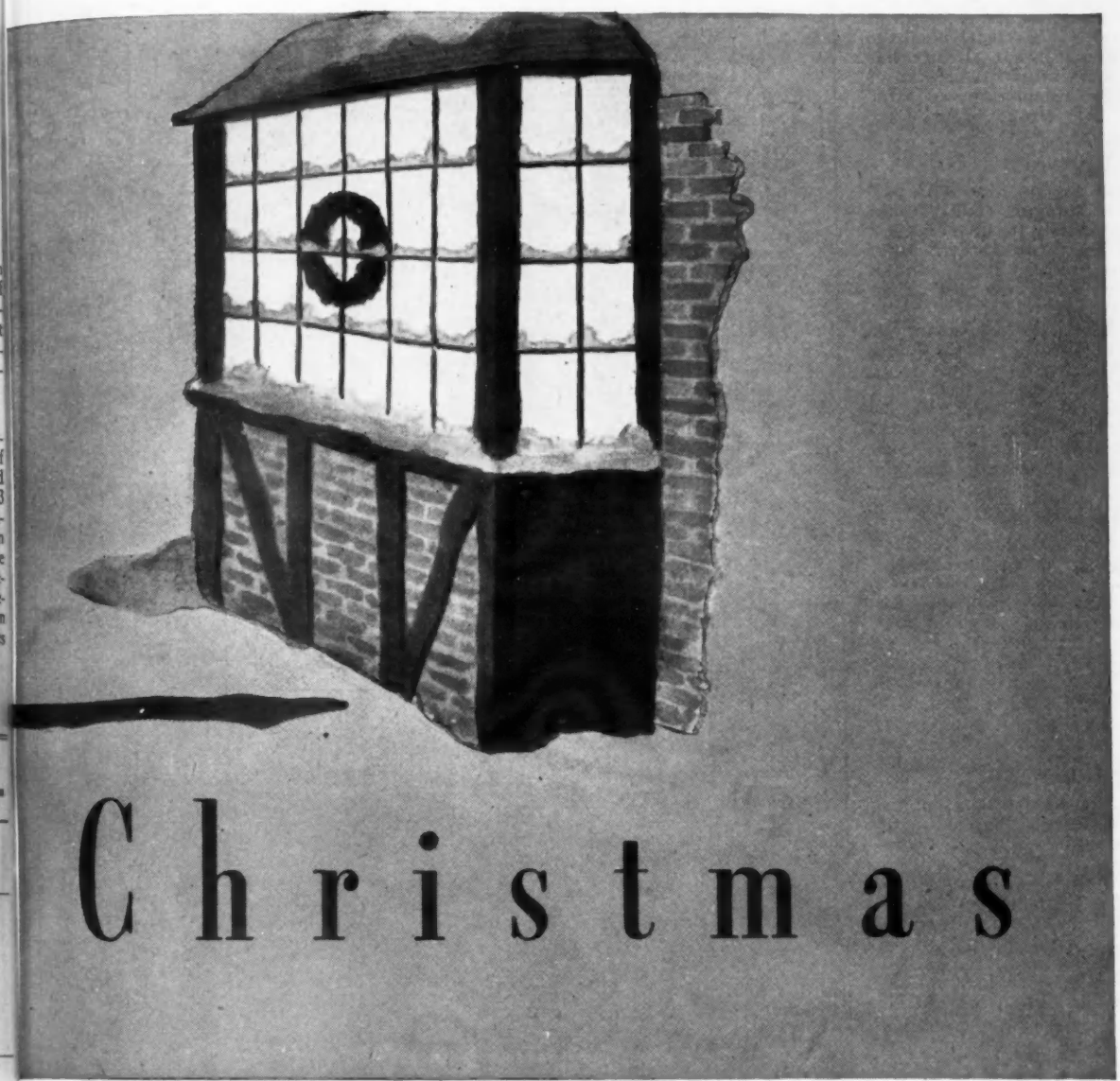
Present estimates give North America 41.1 percent of world reserves, of which 39.6 percent is in the United States, 1.2 percent in Mexico, and 0.3 percent in Canada. Initiative in exploration and development has resulted in more extensive exploitation in the United States than elsewhere, and is responsible for the nation's enviable reserves. However, some alarm has been voiced recently because the United States

Various Estimates of Petroleum Reserves in Principal Producing Countries

(All figures in barrels)

COUNTRY	By PAW[1]	By G. C. Gester[2] Conservative	By G. C. Gester[2] Optimistic	By E. O. Thompson[3]	By V. R. Garfias and R. V. Whetsel[4]	Production in 1943[5]	Percent World Reserves[6]	Percent World Production in 1943
North America:								
United States	20,082,793,000	20,064,162,000	25,000,000,000	20,000,000,000	14,000,000,000	1,501,905,000	39.6	66.1
Canada	150,000,000	140,625,000	200,000,000	135,000,000	.....	9,958,000	0.3	0.4
Mexico	600,000,000	413,270,000	675,000,000	675,000,000	700,000,000	34,500,000	1.2	1.5
Total, North America	20,832,793,000	20,618,057,000	25,875,000,000	20,810,000,000	14,700,000,000	1,546,363,000	41.1	68.0
South America:								
Venezula	5,600,000,000	5,720,913,000	6,250,000,000	5,600,000,000	2,500,000,000	187,000,000	11.0	8.3
Colombia	500,000,000	408,584,000	500,000,000	500,000,000	400,000,000	13,750,000	1.0	0.6
Peru	135,000,000	153,343,000	170,000,000	160,000,000	200,000,000	14,000,000	0.3	0.6
Ecuador	45,000,000	20,094,000	25,000,000	27,000,000	.....	2,000,000	0.1	0.1
Argentina	168,000,000	288,156,000	325,000,000	250,000,000	200,000,000	23,500,000	0.3	1.1
Bolivia	45,400,000	48,004,000	60,000,000	40,000,000	.....	250,000	0.1	0.0
Brazil	1,000,000	.....	.....	1,000,000	.....	.....	0.0	....
Trinidad	235,600,000	291,110,000	350,000,000	400,000,000	150,000,000	25,000,000	0.5	1.1
Total, South America	6,734,000,000	6,390,204,000	7,680,000,000	6,978,000,000	.....	265,500,000	13.3	11.7
Europe (Outside U.S.S.R.):								
Germany (including Austria)	68,700,000	65,116,000	93,000,000	133,000,000	.....	7,300,000	0.1	0.3
France	11,000,000	4,550,000	5,600,000	5,600,000	.....	600,000	0.0	0.0
Italy	1,000,000	1,152,000	1,500,000	1,000,000	.....	35,000	0.0	0.0
Albania	41,000,000	12,460,000	21,000,000	21,000,000	.....	1,100,000	0.1	0.0
Poland	30,000,000	39,490,000	44,000,000	44,000,000	.....	3,500,000	0.0	0.2
Rumania	392,000,000	481,671,000	525,000,000	467,000,000	700,000,000	42,000,000	0.8	1.9
Hungary	75,000,000	50,261,000	75,000,000	75,000,000	.....	5,000,000	0.2	0.2
Czechoslovakia	1,200,000	1,662,000	8,000,000	8,000,000	.....	125,000	0.0	0.0
Total, Europe (Outside U.S.S.R.)	619,900,000	656,362,000	773,100,000	754,600,000	.....	59,660,000	1.2	2.8
Russia:								
Union of Sovet Socialist Republics	5,735,000,000	7,407,250,000	8,556,000,000	8,500,000,000	5,000,000,000	245,000,000	11.3	10.8
Asia:								
Iran	5,000,000,000	6,380,000,000	7,000,000,000		3,500,000,000	78,000,000	9.9	3.4
Iraq	4,000,000,000	4,820,000,000	6,000,000,000		2,500,000,000	23,000,000	7.9	1.1
Kuwait	4,000,000,000			16,450,000,000	.....	.....	7.9	0.6
Saudi Arabia and Bahrein	2,000,000,000	3,147,486,000	4,000,000,000		.....	14,500,000	4.0	0.6
Qatar	500,000,000				.....	.....	1.0	....
India and Burma	167,400,000	110,384,000	125,000,000	150,000,000	.....	4,000,000	0.3	0.2
Japan	36,000,000	23,890,000	25,000,000	25,000,000	.....	3,500,000	0.0	0.1
Netherland East Indies	950,000,000	918,908,000	1,250,000,000	1,250,000,000	1,600,000,000	23,000,000	1.8	1.0
Total, Asia	16,653,400,000	16,400,668,000	18,400,000,000	17,875,000,000	.....	146,000,000	32.8	0.4
Africa:								
Egypt	86,000,000	69,947,000	75,000,000	75,000,000	.....	8,500,000	0.2	0.4
Other Countries:								
Unspecified	41,500,000	13,033,000	25,000,000	.....	550,000,000	295,000	0.1	0.0
Total, World Petroleum Reserves	50,701,800,000	51,095,521,000	61,384,100,000	54,992,600,000	.....	2,271,818,000	100.0	99.9

[1] As reported by Senate special committee to investigate the national defense program. [2] As published in Bulletin of American Association Petroleum Geologists, October, 1944. (Data as of January 1, 1944). [3] As presented before National Stripper Well Association on October 25, 1943. (Data as of 1942). [4] Estimated reserves on January 1, 1939. Published in AIME Petroleum Development and Technology, 1939. [5] From THE OIL WEEKLY Yearbook—Forecast Number, January 31, 1944. [6] Based on reserves estimated of PAW, as shown in Column 1.



The National Supply Company

Executive Offices: Pittsburgh, Pa.

General Sales Offices: Toledo, Ohio. Division Offices: Denver; Ft. Worth; Pittsburgh; Tulsa; Torrance. Export: The National Supply Corporation, 30 Rockefeller Plaza, New York, N. Y., U. S. A.; River Plate House, 12 South Place, London, E. C. 2.

is developing and producing reserves at a greater rate than other nations. It has been pointed out repeatedly that the United States is producing a very high percentage in proportion to the rest of the world. In 1943, for instance, the United States was responsible for 66.1 percent of world production, although having only 39.6 percent of reserves. No other area is calling on its reserves at such a rapid rate. This fact, plus the intensive development that already has taken place in the United States, causes many to predict depletion of this nation's supply before many years have passed.

Heavy Reserves in Asia

Asia is also in a key position with 32.8 percent of world reserves. The present lack of development in various Asiatic areas, however, is indicated significantly by the very low producing rate, which amounted to but 6.4 percent of world output in 1943.

Included in Asia are the Near East fields, responsible for the high volume of reserves credited to Asia. Iran, Iraq, Kuwait, Saudi Arabia, Bahrein and Qatar have estimated reserves of 15-17,000,000,000 barrels. This amounts to 30 percent of the world's reserves, although the area contributes but 5 percent of the production.

Limitless Supply

When peace comes, intensive development is expected to take place in the Near East and several authoritative sources predict that the possibilities for additional production are so great that the territory could supply the needs of the world within a few years.

Viewed from the standpoint of their location, the reserves in Iran, Iraq, Kuwait, Saudi Arabia, Bahrein and Qatar, appear destined to exert a leading influence in the world's postwar petroleum affairs. Located near the "crossroads of the world," these fields could supply oil for much of Europe and part of Africa, especially when additional transportation is provided.

At the close of the war, production of the Near East will be at least 200,000 barrels higher than in 1941, and can be increased sharply with comparatively little additional development. This could eliminate much of the eastward movement of oil from the United States and Venezuela, which was 600,000 barrels daily before the war.

Russia's Possibilities

Russia is credited with reserves ranging from 5,735,000,000 to 8,566,000,000 barrels, with the low estimate constituting 11.3 percent of the world's reserve. In 1943, the country contributed 10.8 percent of world production. Russia is known to have done considerable exploring since the war with Germany began, but the results are not known.

Most of Russia's reserves are in Europe. However, there are also enormous possibilities in much of her Asiatic territory, which has been only slightly explored with excellent indications. Undoubtedly, Russia will be able to supply her own needs, and with more intensive development might become a factor in the export picture.

Reserves in the remainder of Europe are less than 1,000,000,000 barrels, with Rumania leading. In that country, the total stands below 500,000,000 barrels. Prospects for large oil fields do not exist, so Europe will continue to be an importing region.

South American countries have reserves of between 6,500,000,000 and 7,680,000,000 barrels. Venezuela is responsible for most of South America's production and contains the bulk of the reserves. South America is credited with 13.3 percent of world reserves, and in 1943 contributed 11.7 percent of production. Venezuela, which contributes 11 percent of world reserves and 8.2 percent of production, is due to play a more important role in the world picture. Her production in 1945 is expected to be 350,000 barrels more than in 1941. After the war exploitation and development drilling should expand to new peak levels, indicating many new fields will be found.

It is safe to say that during the next decade, the geographical distribution of oil will take on greater meaning in world affairs. The advantages of an adequate supply of petroleum, and the corresponding disadvantages without it, have been so forcibly impressed upon all nations by the war, that no complicated economic study is required to show the importance of oil.

May Become Dominant Resource

If the same intensity of utilization developed by the war is applied to peaceful pursuits in those parts of the world that have to be reconstructed, as well as in those new areas that will be open to endeavor, oil reserves may become the most dominant of all natural resources. It is to be hoped that these deposits do not become the basis of political trading, but rather that they take and keep their place as fundamental factors in a healthy, peaceful, expanding world economy.

WORLD'S FUTURE PROSPECTS FOR OIL

Compiled by Ernest O. Thompson, Texas Railroad Commissioner

(Presented at Austin, Texas, September 20, 1944, before the Committee on Small Business, United States House of Representatives)

	Very Great	Large	Locally Important	Small
North America:				
United States—				
Gulf Coast	X	..	..	..
Mid-Continent (includes West Tex. and N. M.)	X	..	..	..
Rocky Mountains	..	X	..	..
California	..	X	..	..
Eastern	..	..	X	..
Mexico	..	X	..	..
Canada	..	X	..	..
Central America	..	..	..	X
South America:				
Venezuela	X	..	..	..
Colombia	X	..	..	..
Peru	..	X	..	..
Ecuador	..	..	X	..
Paraguay	..	..	X(?)	..
Chile	..	..	..	X
Argentina	..	..	X	..
Bolivia	..	..	X	..
Brazil	..	..	..	X
Europe:				
England	..	..	..	X
Germany	..	..	X	..
France	..	..	..	X
Italy	..	..	..	X
Albania	..	..	..	X
Poland	..	..	X	..
Romania	..	X	..	..
Spain	..	..	..	X
Denmark	..	..	..	X
Hungary	..	..	X	..
Czechslovakia	..	..	..	X
Esthonia	..	..	..	X
Russia—				
Baku Region	X	..	..	..
North Caucaus	X	..	..	..
Perm Basin	X	..	..	..
Emba Region	..	X	..	..
Asia:				
Russia—				
East Ural	..	X	..	..
Sakalin	..	X	..	..
North Arctic	..	..	X	..
Turkaman Region	X	..	..	..
Tadjikstan and Khirgez	..	X	..	..
Irak	X	..	..	..
Iran	X	..	..	..
Arabia	X	..	..	..
Kuwait	..	X	..	..
Qatar	..	X	..	..
Syria	..	..	X	..
Bahrein	..	..	X	..
Turkey	..	..	..	X
India	..	..	X	..
Afghanistan	..	..	X	..
Burma	..	..	X	..
Palestine	..	..	..	X
Netherlands East Indies	..	X	..	..
China	..	..	..	X
Japan	..	..	..	X
Australia	..	..	..	X
Africa:				
Egypt	..	..	X	..
Mozambique	..	..	..	X
Angola	..	..	..	X
French North Africa	..	..	..	X
Madagascar	..	..	..	X

MOTOR TRUCK NEWS FLASH!

FWD TRUCKS AVAILABLE FOR CIVILIAN PURCHASE ON AND AFTER JANUARY 1, 1945

GOOD NEWS — FWD four-wheel-drive trucks, pre-eminent in war services, with production previously restricted almost exclusively for the military, are soon to be available for motor transport, highway, utility, oil fields, and other essential civilian services.

Recent directive from the WPB provides for production of substantial number of FWD trucks in a wide variety of models and types, 2½ to 15 tons capacity; such trucks to be built only for essential civilian uses. FWD trucks built under this release will be available for purchase on and after January 1, 1945. Deliveries will be made in keeping with priority of orders as received; immediate action and prompt placing of orders is urgent to assure delivery before limit of production is reached.

Write—wire—or phone us directly, or the nearest authorized FWD dealer for full information and your eligibility to purchase under these new rationing regulations.

THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
CANADIAN FACTORY: KITCHENER, ONTARIO

FWD TRUCKS

FWD's "H" series tractor trucks with four-wheel drive and gross vehicle weight ratings from 40,000 lbs. to 60,000 lbs. Powered with gasoline engines ranging from 100 to 120 horsepower on wheelbases from 120" to 144" in conventional or cab-over-engine types.

These and other FWD Trucks, 2½ to 15 tons capacity, available to qualified purchasers.

"U" series FWD's with gross vehicle weight capacities of 22,000 to 28,000 lbs. Powered with 125 h.p. gasoline engines, 5 speed transmission, 11.00x20 tires, wheelbase 150". Four wheel drive.

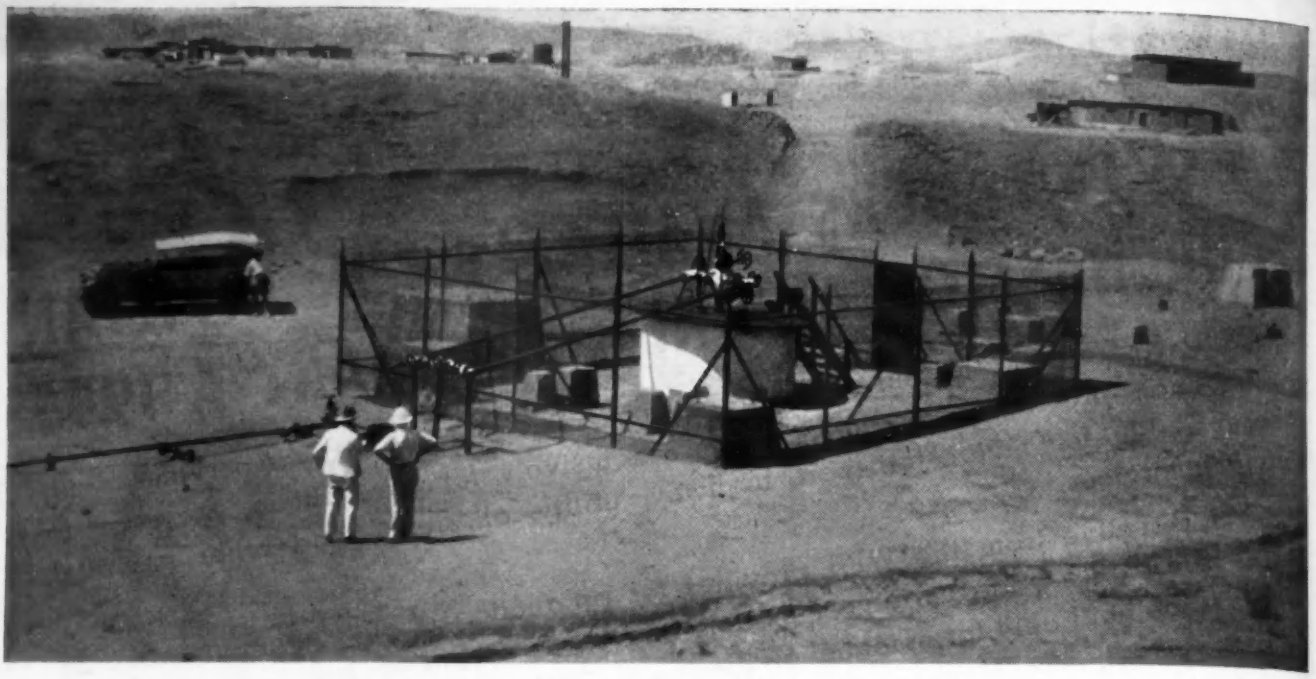
Six-wheel drive FWD trucks with gross vehicle weight capacities of 55,000 lbs. Powered with either gasoline or diesel engines of 150 and 200 horsepower. Wheelbase from 214½" to 276".

Straight trucks in FWD's "H" series range 17,000 to 20,000 lbs. gross vehicle weight capacity with wheelbases from 144" to 154" gasoline engine powered with power plants from 100 to 120 horsepower and with four-wheel drive.

Utility Line Construction and Maintenance trucks by FWD with 5 and 7 man cabs, special power-take-offs and line bodies. Powered with 115 h.p. engine on 144" wheelbase with four-wheel drive, 5 speed transmission, 144" wheelbase and 9.00x20 tires.

FWD's four-wheel drive Road Maintainer — built for underbody scraper use with extra heavy frame and other features that make it the ideal unit for street and road maintenance. Engine 115 h.p. — 5 speed transmission — 8.25x20 dual tires.

"H" series FWD's powered with either gasoline or diesel engines ranging from 150 to 200 h.p. and with capacities ranging from 30,000 to 42,800 lbs. gross vehicle weight. Four wheel drive.



Iraq Petroleum Company well in Kirkuk field, Iraq, still flowing at rate of 2000 barrels daily after 11 years of continuous production.

Near East to Assume A Major Role in Markets of the World

Although Persian Gulf area has been furnishing only 5 percent of world's production, estimates place holdings there at nearly one third of the world reserves. Section now getting an enlarged market. British companies loom large in section but several United States firms have holdings of considerable importance

IN THE wake of controversy heard around the earth in connection with proposed pipe line building in the Near East, or Middle East, the oil industry of the world during the past year has become realistically conscious of the very great potentialities of that region as a major source of oil for the postwar future.

The vast possibilities of the region were summed up in the first sentence of the preliminary report of the [American] Technical Oil Mission to the Middle East, addressed to the president and directors of Petroleum Reserves Corporation and dated at Washington February 1, 1944. That statement was as follows:

"The center of gravity of world oil production is shifting from the Gulf-Caribbean area to the Middle East—to the Persian Gulf area—and is likely to continue to shift until it is firmly established in that area.

Chief of the mission which expressed this significant opinion was E. DeGolyer, distinguished scientist and successful oil operator who has stood high in the war time leadership of the United States oil industry, and others on the mission included John Murrell, C. S. Snodgrass, and W. E. Wrather.

The amazing potentialities of the Middle East were further emphasized in another paragraph of the concise report of the technical oil mission:

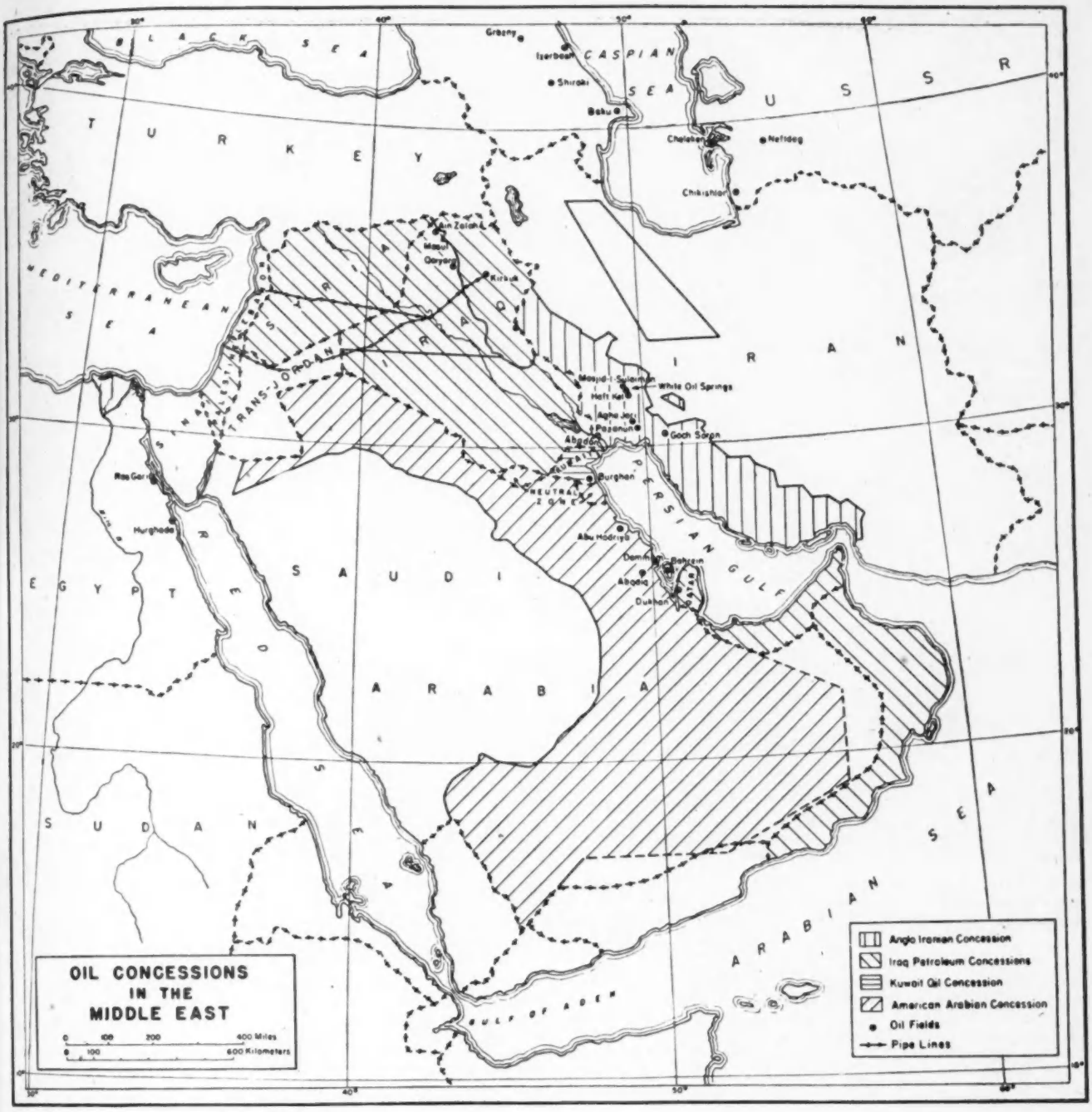
Many Years Supply

"It is the opinion of this mission that, given reasonable time and a very moderate amount of oil field material, any single one of these four groups [operating and holding concessions in Iraq, Iran, Saudi Arabia, Bahrein, Kuwait, and Qatar] can develop and maintain within its own properties sufficient production to supply world requirements from the Middle East area for many years to come. For the next 10 to 15 years at least, the Middle East area is likely to develop and maintain productive capacity of as much as four times its probable market outlet."

So great are the known and probable reserves of petroleum in the Middle East, following an almost unbelievably small amount of prospecting and development, that the region ranks on equal footing with the highly developed United States as a future source of oil even under the most conservative basis of appraisal. And when consideration is given to the large number of favorable prospects still undrilled and the vast areas so far practically unexplored, it appears that the Middle East eclipses even the United States in future oil potentialities. Although the course of future development will be determined by postwar political and economic decisions yet to be made, this region of ancient civilizations has arisen anew on the map as a promised land for an oil age. For men whose mission it is to search out the earth's stores of petroleum, the region has assumed the earmarks of a happy hunting ground.

Almost Incredible Results

The enormous reserves already uncovered represent the astounding results of very limited exploration which has appeared magical, as the discoveries have been made through the drilling of less than 150 wildcats—less than 5 percent of the number of wildcats regularly drilled in the United States every year. These almost incredible results have been possible, of course, because the region is one of a few specially favored spots of the earth for the existence of rich petroleum deposits. But the discovery record is explained in large part also by the circumstance that modern oil finding had been developed to a highly proficient science when it was turned upon the region in the comparatively recent past. Iran began producing oil commercially in 1913, but the country's



This map, which accompanied preliminary report of United States Technical Oil Mission to Middle East, is reproduced, with permission, from July, 1944, Bulletin of the American Association of Petroleum Geologists.

huge possibilities were not known until more recent years, while other countries of the region commenced commercial production as follows: Iraq in 1927, Bahrein Island in 1933, Saudi Arabia in 1936. Someone has commented that results in the Middle East have been equivalent to those which might have occurred on the Gulf Coast if the latter area would have had a ready-made modern science of oil finding turned loose upon it in its initial development.

Tabulation of Estimates

In estimating the reserves of the Middle East, the DeGolyer mission expressed them under several different definitions. The estimates were as here tabulated:

Reserves Actually Proved

COUNTRY	Billions of Barrels
Iran	5 to 6
Iraq	4
Kuwait	4
Saudi Arabia and Bahrein	2
Qatar, less than	½
Total	15½ to 16½

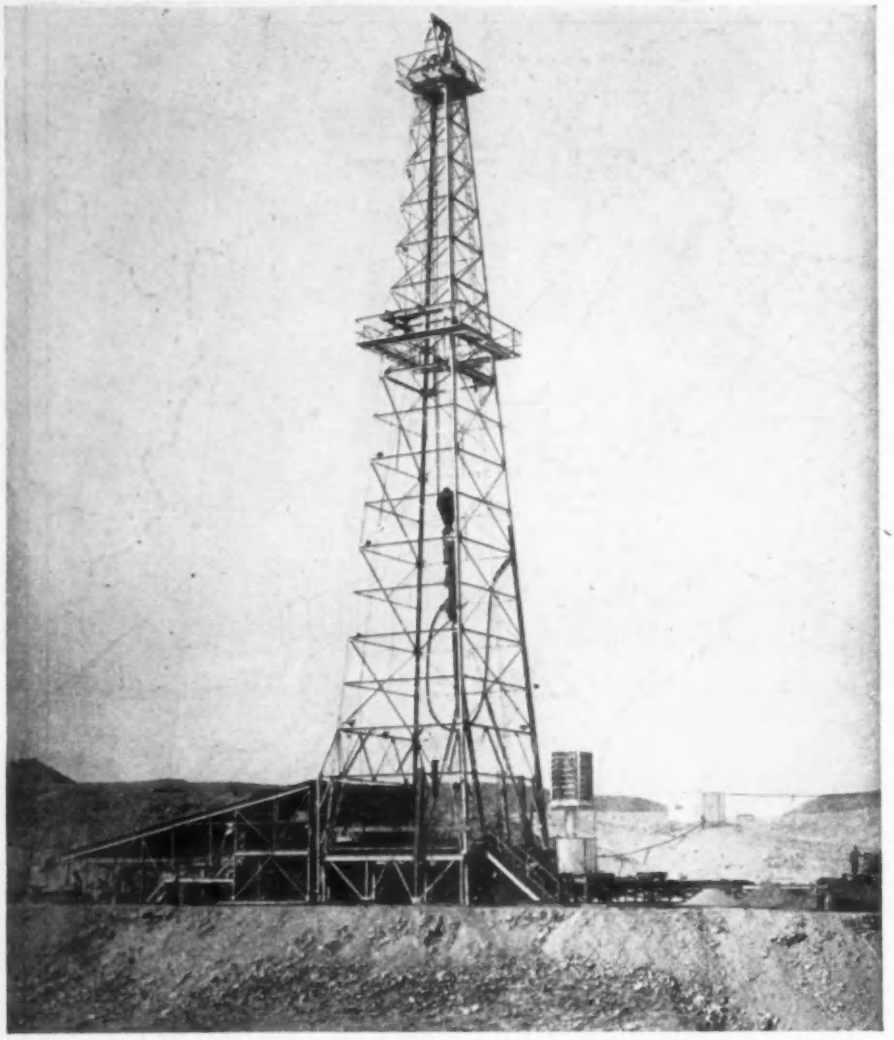
Proved and Indicated Reserves

(Reserves proved by developed fields and indicated by fields discovered but not yet fully explored)

COUNTRY	Billions of Barrels
Kuwait	9
Iran	6 to 7
Iraq	5
Saudi Arabia and Bahrein	4 to 5
Qatar	1
Total	25 to 27

The significance of these figures on Middle East reserves is apparent through comparison with reserves elsewhere. The 15½ to 16½ billions of barrels of estimated actually proved reserves in the Persian Gulf area represent nearly one third of known reserves in the world, on the basis of the world estimate of 50,701,800,000 barrels made by the Petroleum Administration for War in early 1944. The figure for the Middle East was not far under that of 20 billions of barrels assigned to the United States.

Even more significant, perhaps, than the estimates of proved and indicated reserves of the Middle East was the further discussion in the DeGolyer report, dealing with prospective areas of the region. For although Kuwait heads the list in the estimate of "proved and indicated reserves," with a figure of 9 billions of barrels, that small political subdivision is put far down at the bottom of the list in speculation on possi-



Dishel el Daba wildcat operation, 12 miles south of Hurghada field, Egypt, drilled by Socony-Vacuum Oil Company in 1938. This well and two later tests failed to find production. Well No. 3 was shut down at 2000 feet in 1941. These wells represent southermost tests in Red Sea graben area.

bilities for future discoveries. Conversely, and evidently in recognition of the greater areas that they embrace, some of the other Middle Eastern countries are conceded immense possibilities for future discoveries. This angle of Middle Eastern reserves was discussed in the report as follows:

Iran and Saudi Arabia First

"Obviously, any attempt to appraise the prospective areas of this region must be highly speculative. In our opinion, in any attempted rating of undrilled prospect values, Iran and Saudi Arabia must vie for first place. Iraq ranks close third, with Qatar a somewhat distant fourth, and Kuwait a definitely distant fifth. Too little is known of the values of other areas to justify an attempt to rate them."

Against this remarkable background of potential and possible production of oil, the actual production of the present time, although involving substantial volume, appears very small. The region is producing only a small fraction of its potential, whereas most other areas of the world are producing more or less close to capacity. In these circumstances, the Middle East naturally holds at present a dominant position with respect to future world markets. Developed under highly competitive conditions, the region conceivably could take over a lion's share of world markets and determine prices and production throughout the rest of the world. And even if conservative developments is adhered to, sufficiently competitive conditions are assured already to make the region a dominant factor in world markets henceforth. The enlargement of refining facilities carried out in 1944, the tentative plans for important new pipe lines, and the negotiations for new concessions are only the beginning of expansion of the oil industry of the Middle East. This expansion appears destined inevitably to continue much further in the future, especially after the war, when peace and reconstruction bring strong world-wide demand for petroleum.

Refinery Expanded

In 1943 the Persian Gulf area produced (and largely refined) about 325,000 barrels per day of petroleum, which was only about 5 percent of the world total of production, while holding as shown above nearly a third of the world's known reserves. In 1944 the region has increased its production, because larger market has been developed through expansion of refining facilities, and as this year ends, refining capacity is approximately 500,000 barrels per day, affording market for that much crude, while a limited volume of additional crude is shipped out in raw form. However, 500,000 barrels a day of refining capacity is only 10.6 percent as much as the present capacity of 4,720,500 barrels daily of the United States, which has only slightly higher crude reserves than the Middle East.

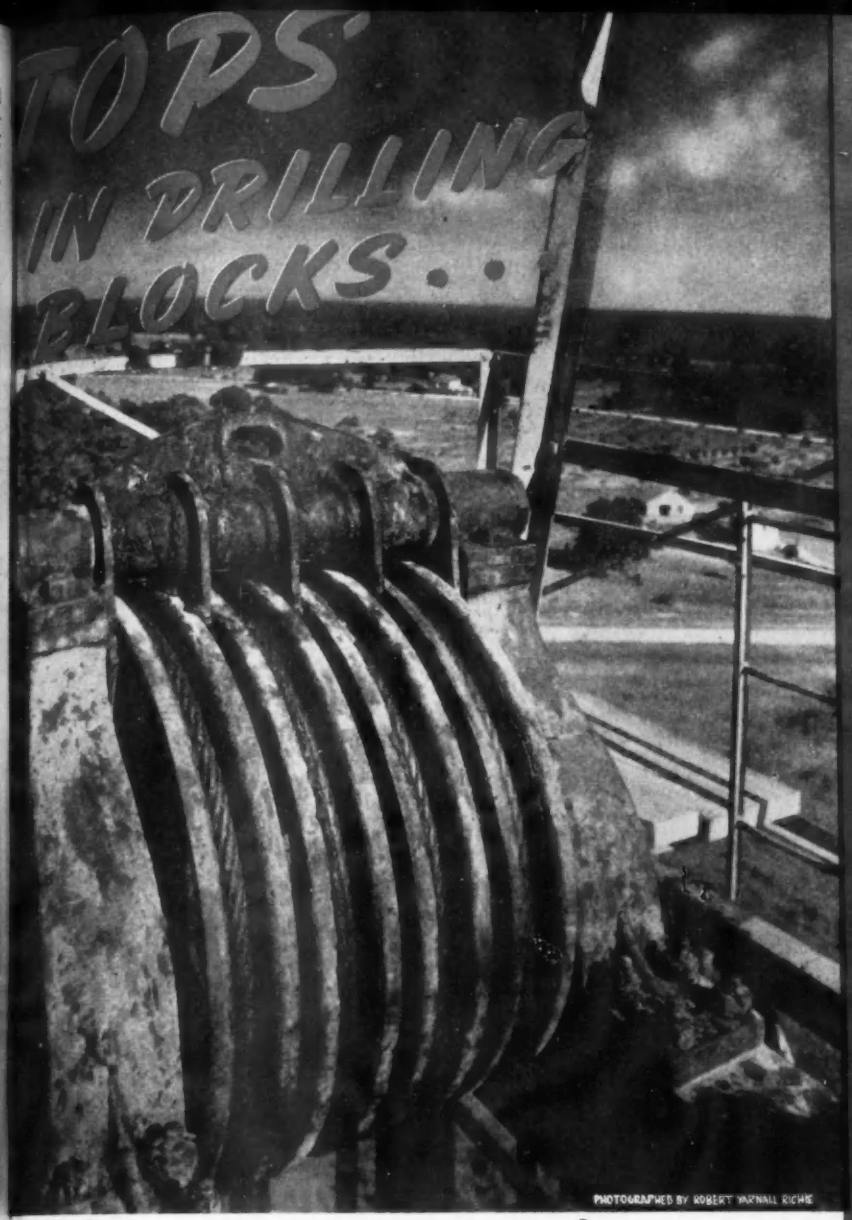
A further doubling of Middle Eastern refining and crude production to more than 1,000,000 barrels daily is a distinct possibility for the early postwar period, as evidenced in the now stymied but not abandoned plans for pipe line construction in the region. Those plans, under which the United States government would have financed a large pipe line across Saudi Arabia, and under which large new refining capacity would have been built on the eastern Mediterranean, called for well over 1,000,000 barrels per day of ultimate refining capacity. It now appears quite unlikely that the original plans will be carried out in so far as United States government participation in the project is concerned, but there have been recent intimations that similarly impressive expansion will be undertaken by private interests.

Several Lines Reported

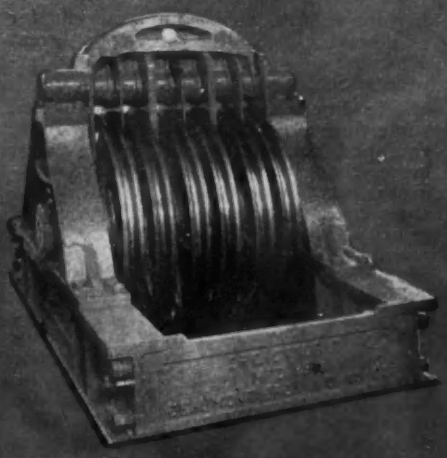
The proposed United States-financed pipe line would have been a system totaling 1500 miles of pipe, with the trunk line of 24 and 26-inch pipe, capable of carrying 200,000 to 250,000 barrels daily, from fields in Saudi Arabia, Bahrein Island, Qatar, and Kuwait, to a projected refinery of the same capacity at the eastern end of the Mediterranean —perhaps Haifa, although Alexandria also was mentioned. This would have been largely an American project throughout, serving fields in which American interests in the Middle East are largely concentrated. However, British-controlled interests at the same time contemplated an equal or greater expansion of their refining and production to match the American projects, having tentatively planned to increase refinery capacity at Haifa to 350,000 barrels daily from the 60,000 barrels of January, 1944, along with stepping up of pipe line capacity from Iraq fields by building a second line, of 24 or 26-inch diameter, paralleling the original Kirkuk-Haifa line. The British press also published reports at that time stating that in connection with enlargement of the Abadan, Persia, refinery then under way, crude supply would be stepped up by building more feeder pipe lines from the Iranian fields within a radius of 200 miles, while some of the refined products turned out by the plant would be laid down at Haifa on the Mediterranean through a new 900-mile, 20-inch products line from the Persian Gulf to the Mediterranean, saving the long tanker hauls through the Suez Canal.

Kirkuk Line Planned

Many oil men expect a postwar oil rivalry between the various Near East countries and the different companies operating in the area. They fear, as a result, such large quantities of petroleum will be placed on the international market as to create chaotic conditions. This belief is substantiated by the known desire of Iraq Petroleum Company to expand its pipe line facilities. Thus, the oil fields of Iraq, as well as those of neighboring Saudi Arabia, are likely to get enlarged transportation facilities as soon as conditions permit. Iraq Petroleum Company has been try-



PHOTOGRAPHED BY ROBERT YARNALL RICHIE



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DREADNAUGHT Drilling Traveling Blocks are made in sizes ranging from 6 sheaves (360 tons capacity) to 3 sheaves (150 tons capacity).

Peak performance delivered by Dreadnaught Drilling Crown and Traveling Blocks is the result of 40 years of constant improvement in their design and construction. Such proven features as the "Straight Line" design and even load distribution, resulting from the "A" frame type construction, together with heavy duty roller bearings with individual lubrication, large diameter high tensile strength alloy steel pins, extra heavy steel plates, tough wear-resisting steel sheaves, have contributed to Dreadnaught's position as 'tops in drilling blocks.'

Complete *mechanical details* on Dreadnaught Drilling Crown and Traveling Blocks will be found in Volume 1 of the Composite Catalog or descriptive literature will be sent on request.

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ing for months to obtain materials for a new big-inch line from its great Kirkuk field to Haifa on the Mediterranean Sea.

The line would have been started some time ago but no English mills are equipped for producing rolled pipe larger than 10 inches in diameter, making it necessary for the company to apply for American WPB approval and priority—which so far has not been granted. The present pipe line capacity from the Kirkuk field, which is delivered to both Haifa and Tripoli, is 80,000 barrels daily. The lines were being operated at the latter rate during October and November. To supply the 80,000 barrels per day that can be handled by present lines requires the operation of only 6 wells in the field, all of which, even so, are choked back to less than 70 percent of their full producing rates on open flow. As a result, all other wells in the field must be shut in.

Production Held Down

Kirkuk production for all of the year 1941 totaled only 10,280,472 barrels, as compared with 17,768,802 barrels in 1940, and 28,551,565 barrels in 1939. In 1942, the field produced 16,500,000 barrels, increasing to nearly 20,000,000 barrels in 1943. Near the end of November, 1944, fifteen newly-drilled wells had been completed in the field—nine of them shut in after completion—and 34 more remain to be drilled before the field can be restored to its production potential of 700,000 barrels per day or more. (Some of the wells were destroyed in the Iraq war.)

The significance of all those proposed or reported plans which have failed to get beyond the discussion stage is that at least a substantial part of them were bona fide proposals. From those early plans to actual consummation of similar plans without benefit of government financing would not be a long step. In such private undertaking of similar plans, encouragement may be offered by the recently published information on the relatively low-cost operation of the two Big-Inch pipe lines in the United States.

United States Competition

Furthermore, whether or not proposed large pipe lines are built in the Middle East, increased market for oil of the region is to be anticipated. This prospect is accentuated by the fact that there will be a surplus of tankers available for world trade after the war. If Middle Eastern oil does not move to the Mediterranean by pipe line, it will do so by tanker via the Arabian Sea and the Red Sea and Suez Canal. Some of it perhaps will go into New York harbor, in successful competition with oils from southwestern United States.

While planning was in terms of 1,000,000 barrels a day of refinery capacity for the Middle East, it was calculated that only very limited drilling would be necessary for several years, because of the enormous shut-in producing capacity of existing wells. To supply the trans-Arabian pipe line and its companion refinery on the Mediterranean, it was contemplated that existing wells in Saudi Arabia and Kuwait and on Bahrein Island would be supplemented by only 5 new wells in the first year and 10 in the second year. In Iraq, it was thought, no new wells would be needed in the first year and thereafter only 5 or 10 per year. In Persia, according to estimates, only 7 new wells per year would be needed.

At the beginning of 1944, crude oil production in the Middle East was averaging approximately 400,000 barrels daily, according to the DeGolyer report, which itemized the output by countries as follows:

Daily Crude Production, Early 1944

COUNTRY	Barrels Daily
Iran	275,000
Iraq	90,000
Saudi Arabia and Bahrein Island	35,000
Kuwait and Qatar	(Shut in)
Total	400,000

Production Trends

During 1944, however, about 125,000 barrels a day of new refining capacity has been provided in the region, and the same increase in crude production has been required. On the basis of scheduled increases in capacity of refineries taking crude from the different countries, indicated trends of production in 1944 are as follows:

COUNTRY	Barrels Daily Production		
	Jan. 1 1944	Aug. 1, 1944	Dec. 31, 1944
Iran	275,000	275,000	357,000
Iraq	90,000	110,000	110,000
Saudi Arabia and Bahrein Islands	35,000	46,500	60,000
Total	400,000	431,500	527,000

Closely in line with these figures on crude production are data on refining capacities of the three important refineries operating on Middle Eastern crude. Iranian production is refined at Abadan, at the head of the Persian Gulf, in one of the two largest refineries in the world, owned by British interests, along with the Iranian fields. Iraq crude feeds a British controlled refinery at Haifa, Palestine, through a pipe line which also forks off to the north and delivers some crude to a tanker loading terminal at Tripoli, Syria, designed for routing crude to refineries in France. The several prolific fields of Iraq, along with the pipe line outlet, are controlled one half by the British and one fourth each by the French and America. From the field on Bahrein Island and several adjacent mainland fields in Saudi Arabia, operated by American interests, crude goes to the affiliated refinery at Bahrein. Each of these three major refineries is on tidewater, in position to serve world markets. In addition, there are small topping plants in each producing area, supplying local requirements.

Increases in capacity of the three principal refineries scheduled for 1944, according to the DeGolyer report, were as follows:

REFINERY	Barrels Daily Crude Refining Capacity		
	Jan. 1, 1944	July 1944	Dec., 1944
Abadan	280,000	280,000	362,000
Haifa	60,000	80,000	80,000
Bahrein Island	33,500	45,000	58,000
Total	373,500	405,000	500,000

British Loom Large

In the report of the technical oil mission, it was pointed out that all important oil fields and practically all important prospective oil territories of the Middle East are held by one or another of four companies or groups of companies, representing British, American, French, and Dutch interests. Of these four groups of companies, one is wholly owned, another is half owned, and a third is one-quarter owned by Anglo-Iranian Oil Company, Ltd., which is controlled by the British government, through ownership of a majority of the ordinary shares, while in the quarter-owned group another one quarter interest also has British participation, being that of the Royal Dutch-Shell organization. Thus British interests loom large in the Middle East holdings, controlling all the industry as developed to date in Iran by Anglo-Iranian Oil Company; a half interest in the one field and Sheikdom-wide concession in Kuwait, as Kuwait Oil Company, Ltd., is jointly owned by Anglo-Iranian and Gulf Oil Corporation of the United States; while Anglo-Iranian and Royal Dutch-Shell each owns a quarter interest in Iraq Petroleum Company, Ltd., and associated companies, which hold the fields of Iraq and complementary pipe lines and refining facilities, the oil fields of Qatar, and important concessions in Syria, Palestine, and the Trucial Coast. French interests share in the Iraq Petroleum properties and concessions to the extent of one fourth, and American interests by one fourth through Near East Development Corporation (Standard of New Jersey and Socony-Vacuum). Apart from the above three major groups of British dominated companies, of which, however, one is half owned and another one-quarter owned by American interests, stands the fourth major group in Middle Eastern operations, wholly American, and owned jointly by Standard Oil Company of California and The Texas Company. Through Arabian American Oil Company, those two American companies jointly hold the oil fields and a substantial concession in Saudi Arabia, and through Bahrein Petroleum Company, Ltd., they hold producing properties in the Sheikdom of Bahrein and operate a refinery on Bahrein Island.

American-British Ownership

Referring back to the estimates of reserves in the Middle East, while considering this information on ownership, it is found that British and American interests together (including Royal Dutch-Shell) hold 91 percent of the actually proved reserves and more than 94 percent of the "proved and indicated" reserves. Under either definition, the British hold more than 50 percent of the reserves and a substantially larger share than combined American interests, although inclusion of "indicated" reserves materially improves the American position, while cutting down on the relative position of the British interests.

Of the actually proved reserves, estimated up to 16½ billions of barrels, the British interests (including Royal Dutch-Shell) hold nearly 61 percent and American interests a little over 30 percent. But of the "proved and indicated" reserves, estimated up to 27 billions of barrels, the share of British interests (including Royal Dutch-Shell) represents less than 54 percent and the share of American interests nearly 41 percent.

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Decided Pickup Registered In Near East Oil Activities

Spectacular results expected when drilling can be undertaken on extensive scale in Iran, Iraq, Saudi Arabia and Egypt

ALTHOUGH the war prevented much activity planned in Iran, Iraq, Arabia and Egypt, moderate exploration and development nevertheless have gone on in several areas, and as 1944 nears an end, a decided pick-up has taken place. More intensive drilling operations than in any previous period will undobutedly be seen when needs can be satisfied with regard to required drilling equipment, supplies and personnel.

Full producing possibilities of most of the fields remain to be established, but as favorable structures await their first drilling tests results are anticipated on a spectacular scale.

Unanswered is the question: "What will be done with the oil?" With production potentials already far in excess of the capacities of Near East refineries, transportation facilities and market outlets, the proving up of still greater reserves will be observed with special interest.

Saudi Arabia Producing Ability Up

Since 1941 some development has been pursued in Saudi Arabia, and present activity of the Arabian American Oil Company indicates that the necessary oil to keep a large size pipe line in operation will be available well before the line itself could possibly be completed. In other words, there is or will soon be available several times the amount of oil needed to operate at capacity the new and expanded refining plants at both Ras Tanura and on Bahrein Island.

At present there are three proved producing fields south of Qatif and north of the base of the Qatar Peninsula. The only operating wells, however, are in the Dammam field proper, which alone has pipe line outlets to terminals east and north of the field.

The nearby Abu Hadrya field has only the discovery well, which has been shut in since its completion before the war. Five wells have been drilled and shut in to date in the Abqaiq field, nearly 100 miles south of Dammam.

A fourth field may be opened in the near future within five or six miles of Ras Tanura, depending upon the outcome of a wildcat test now underway at Qatif. The location is 18 miles north of the Dammam field, and was based on information gained from a recent dry test and several core holes for structure that have already been drilled in the area. Surface structure indicates considerable closure on the Qatif dome.

During the critical period of fighting in the eastern Mediterranean area most of the 27 producing wells at Dammam were plugged with cement. Drilling of these plugs and reconditioning of the affected wells is now in progress and additional field development wells will be drilled as soon as equipment and materials become available.

It is probable that approximately 50 wells will ultimately be completed in the field. Wide spacing is possible because of highly porous and permeable colitic limestone pay sections.

Four separate pays have so far been tapped at Dammam, yielding crudes ranging from 28 to 56 degrees. The highest gravity oil comes from the uppermost sand. The horizon is spotty and only a few wells have been completed in it. An effective and measurable water drive has been observed in the lower sands of the field.

Total 1944 production of Dammam wells is estimated at 5 million barrels, of which amount approximately 85 percent was shipped to the Bahrein refinery by pipe line and barge. A ten-inch line has been delivering an average of 2700 barrels daily to the small refinery at Ras Tanura—24 miles north of the field. This line is adequate in size for handling the full crude requirements of the new 50,000-barrel refinery that will be completed at Ras Tanura in 1945.

Total production of Dammam field to date is more than 30 million barrels. Ultimate importance of the Abqaiq field may be equal to that of Dammam, since structure is equally large and field pressures are several times higher. Completion of additional refinery installations on Bahrein Island will provide an outlet for at least another 20,000 barrels per day from Dammam.

Petroleum Development, Ltd., (Iraq Petroleum Company), probably will begin immediate development of the known reserves of Qatar Peninsula, where it holds exclusive rights. This will greatly enhance the market position of the company, since Qatar oil can be handled directly by sea-going tanker, whereas the output from the fields in Iraq is limited by the capacities of pipe lines to the Mediterranean and rail connections with Alexandretta and Basra.

Only Two Areas Drilled Up

The field on Bahrein Island, in the Persian Gulf, is considered to be essentially drilled up, although of the 74 wells reported completed no more than 50 are on steady production. The remainder has been shut in pending enlargement of the refinery on the island and greater demand for output.

In Egypt, the fields at the head of the Red Sea are no longer regarded as important, and attempts to extend their producing areas have been unsuccessful during the war period. By forcing wells to the limit, the fields of Ras Ghareb and Hurghada increased their production considerably to meet the urgent needs of the Allied military forces during the North African campaign. Unless new production is found soon within the area of the Red Sea graben block, this area will not receive much more exploratory attention soon.

Interest in Egypt has shifted to the Mediterranean coastal strip, including the Nile Delta area and the territory east and west. Surface geology and geophysical surveys have confirmed the existence of large closed structures along at least three east-west trend lines, involving a thick series of Mesozoic rocks.

In October, Standard Oil Company of California and The Texas Company started a South Mediterranean Company wildcat within sight of the Pyramids west of Cairo. Standard Oil Company of Egypt, on the same date, was preparing to drill another wildcat in the center of the Sinai Peninsula, 200 miles east and slightly south of the South Mediterranean Company venture. Other major operators plan to enter the play as soon as possible. The Egyptian government has granted rights covering a wide strip from the vicinity of Matruh eastward to the Palestine border. There is ample reason to expect that important developments will be taking place there in the months ahead.

Anglo-Iranian Control

The tremendous producing potential of Persia is controlled almost entirely by the Anglo-Iranian Oil Company, which is to say, the British government. Its plans for the further development of producing fields or commercial discoveries that have been proved may depend on the British-American oil agreement, or may be subject to more rigid scrutiny and control by the Iranian government itself, as indicated by recent developments.

It remains to be seen what action the Iranian government will take with regard to the granting of rights in southern Persia. Any new fields opened up on the shore of the Gulf of Oman would be much closer to outside world markets, and it seems apparent they can be opened with a minimum of exploratory effort.

Iran meanwhile is postponing commitments on development rights in the northern part of the country as well as the southern, having recently declined a proposal by Russia, which has been seeking rights on lands adjacent to the Caspian Sea. Soviet interest was directed particularly toward acquisition of rights in the Samnan area, east of Teheran, where the Russian-capitalized Kavir Khorian Oil Company completed a discovery well before the Russian revolution. No further drilling subsequently has been done in the district. Nearest commercial production is at Chikishlar, just across the Atrak River, in Russia, 150 miles to the north. However, Amiranian Oil Company several years later drilled a wildcat that discovered oil near Asterabad, on the Persian side of the border. That discovery also has not been further developed, although plans were under way before the war for laying a 900-mile pipe line from Asterabad to Chahbar, on the Gulf of Oman. While American interests are seeking concessions in southern Iran, in competition with British interests, it is reported that Americans showed no competitive interest in the Russian negotiations for northern Iran rights, because of the inaccessibility of the region. Russia's bid was the first move that country has made toward undertaking oil development outside its own borders.

While denial of the Soviet offer did not directly affect American and British interests, it was regarded as indirectly responsible for Iran's decision to postpone granting of concessions anywhere in the country until after the war.

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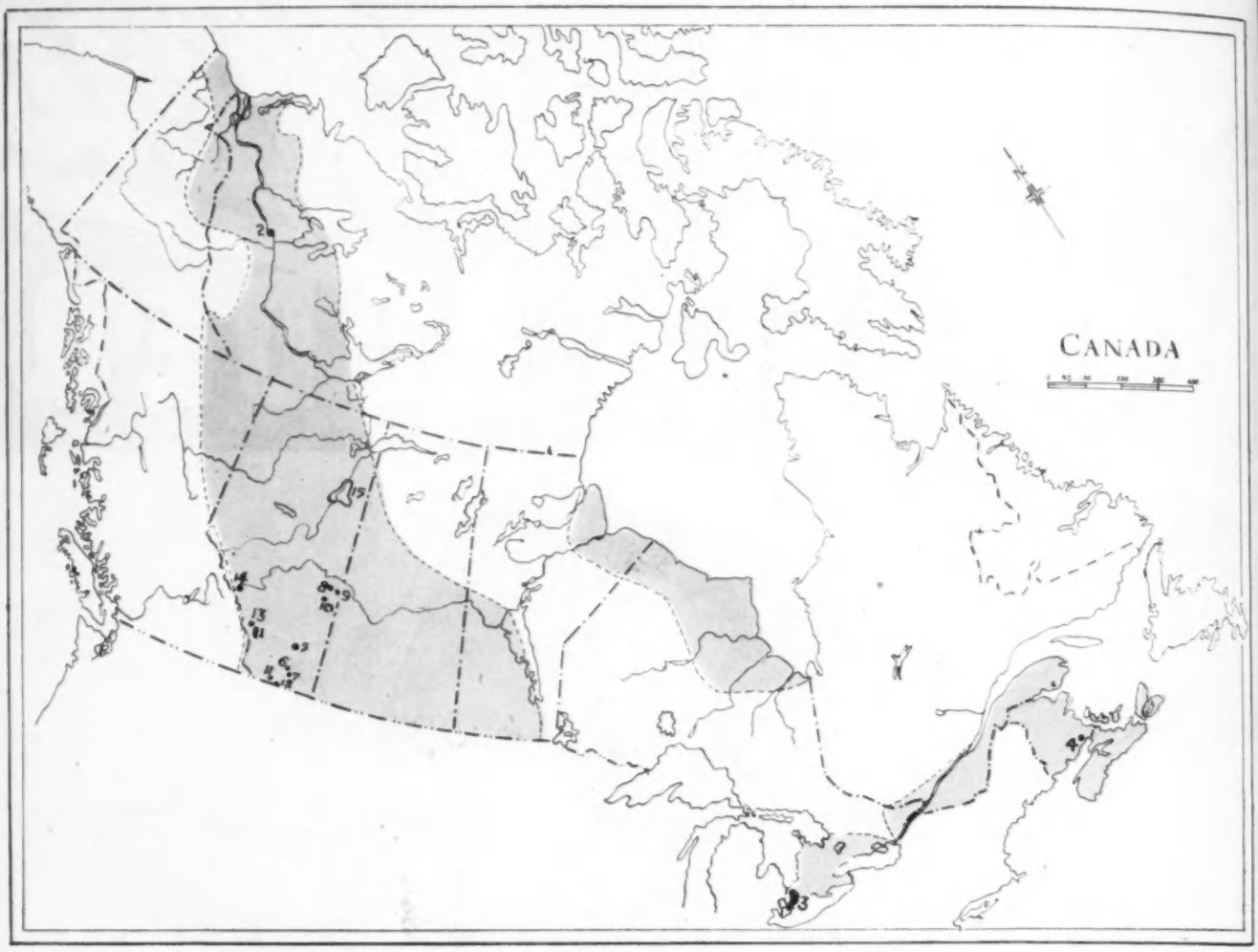

POTENTIAL OIL PRODUCING AREAS OF CANADA

Areas regarded as favorable for accumulation of oil and gas are shown in green. Solid black areas and numbers represent the following producing areas: 1—Turner Valley; 2—Norman Wells; 3—Southwest Ontario oil fields; 4—Stony Creek oil and gas field; 5—Princess-Steveville oil area; 6—Taber-Barnwell oil area; 7—Conrad oil area; 8—Vermilion oil field; 9—Lloydminster oil area; 10—Wainwright oil field; 11—Del Bonita-Twin River area; 12—Red Coulee oil field; 13—Moose Dome oil area; 14—Ram River-Shunda Creek area; and 15—McMurray Tar Sands.

Third of Canada is Rated As Potential Oil Area

Geologists see a possibility that Dominion may become self-sufficient in petroleum. Promising lands tested so far by only limited wildcatting but extensive work is under way. Production for current year increasing but imports still heavy

By C. O. NICKLE, Staff Representative in Canada

CANADA . . . increasingly oil hungry, dependent for 80 percent of its petroleum on the United States and Latin America . . . is regarded as one of the prime hopes for replenishing the world's declining proven oil resources.

What has Canada got that bolsters this hope? So far, not much in the line of actual production, by comparison with the United States. The Dominion, from small beginnings in Ontario 80 years ago to the nation-wide oil search today, has produced only about 110,000,000 barrels. Of that yield, more than 70,000,000 barrels have come from the Turner Valley field, Southern Alberta Foothills, only major field so far discovered.

Canada's oil production in 1944 will exceed 10,000,000 barrels, a slight gain over the 1943 return, but the increase is not yet keeping pace with greater consumption. In 1943, Canada consumed 51,600,000 barrels of gasoline, fuel oil and other processed oil products. In 1944, consumption increased 3,000,000 barrels the first six months and likely will be 58-60,000,000 barrels for the year.

It is obvious that Canada has a long climb ahead before it can be rated a source of supply for the international market. Production must be increased by six to seven times before it can even meet its own needs.

Still, say geologists who have worked in Canada, the six to seven fold increase may not be as difficult as might be suspected from the fact that 80 years were required to build up present production.

About one third of Canada's 3,700,000 square miles is regarded as potential oil land. So far only 30,000 acres actually produce oil.

Canada's potential oil land covers the maritime provinces (Nova Scotia, Prince Edward Island and New Brunswick); the Gaspe peninsula of Quebec; Southwestern peninsula of Ontario; Northwest Ontario and Manitoba between

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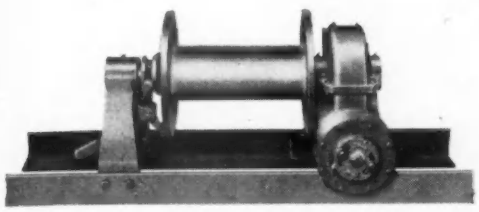

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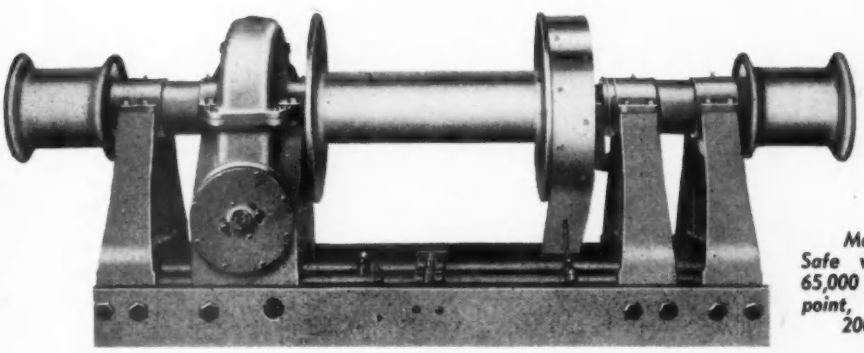

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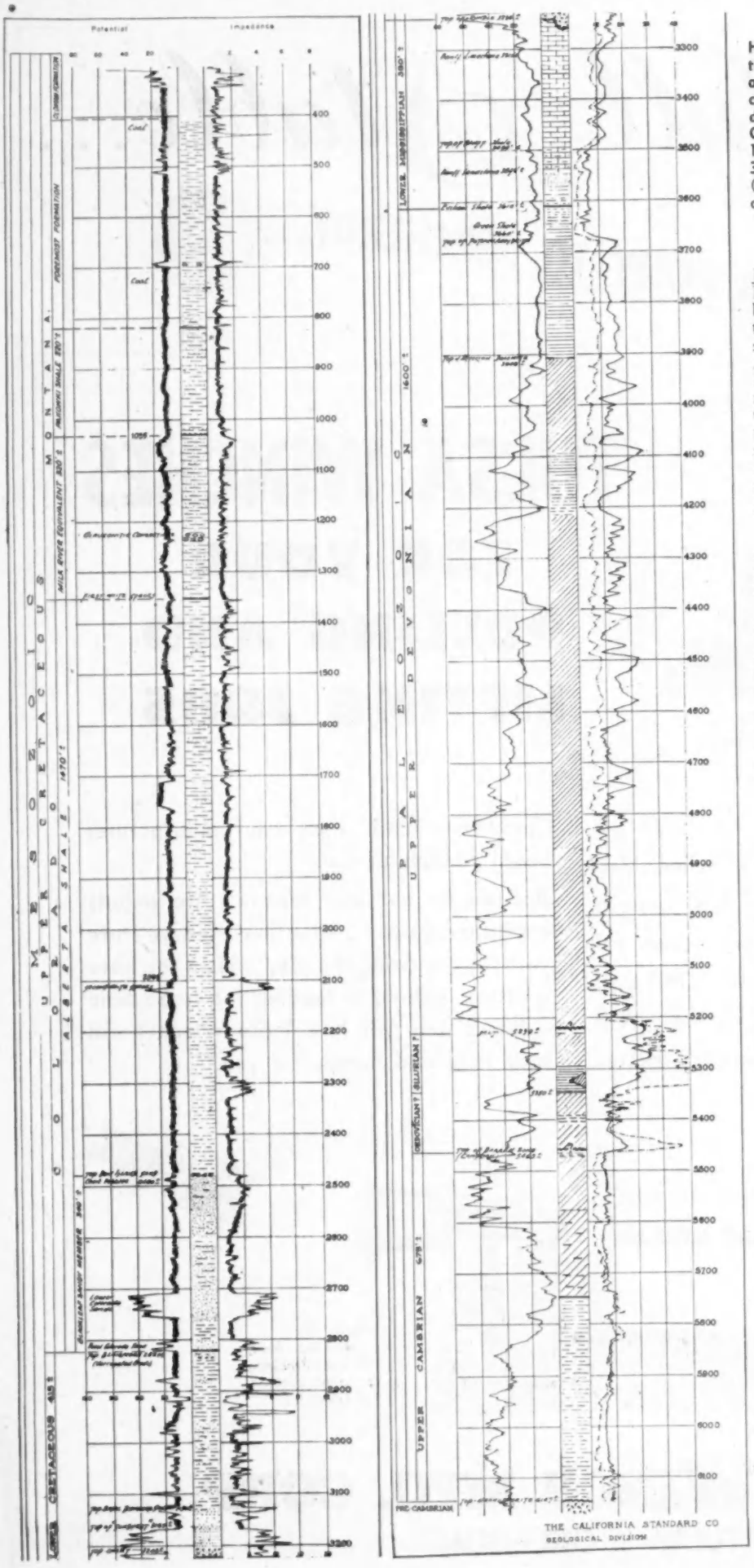

PRINCESS WELL LOG

Here is shown well log of the discovery well of the Princess area, showing principal markers and generalized stratigraphy. The well was carried to the top of the Pre-Cambrian. Production in the well, The California Standard Company's Princess-C. P. R. No. 8, is from an 18-foot porous horizon in the Devonian between 3965-83 feet. The well entered the Devonian (Jefferson) dolomite at 3913 feet. Top section of well is shown at left, and bottom section at right.

James Bay and Churchill adjoining Hudson Bay; the interior plains, embracing 375,000 square miles in a rough triangle from the United States on the south, Winnipeg on the east, northern Alberta on the north, and the Alberta Foothills on the west; 40,000 square miles in the northeast corner of British Columbia; 15,000 square miles covering the foothills belt of Alberta; 150,000 square miles in the Mackenzie River Basin of Northwest Canada; and 10,000 square miles at the head of the Peel River in the Wind River Basin of the Yukon Territory.

The Turner Valley field, which is 22 miles long and 1 to 3 miles wide, is now yielding 8-8,500,000 barrels yearly from 2700 to 10,000 feet.

No. 2 field is Norman Wells, a 4500-acre pool on the MacKenzie River in the Far Northwest, discovered in 1920 and developed the past 2½ years by the United States Army and Imperial Oil. With a potential of about 10,000 barrels daily, and estimated reserves of upwards of 35,000,000 barrels, this field is producing 3500 barrels daily, the capacity of its pipe line outlet to Whitehorse, 550 miles away.

Small Fields

No. 3 are the small fields in Southwestern Ontario, Canada's first oil sources, which have produced 35,000,000 barrels to date, and are now yielding around 150,000 barrels per year. Best of these is Oil Springs, which has yielded about 8,000,000 barrels from a 1⅓ square mile area.

No. 4 are the new and relatively undeveloped fields on the Plains of Alberta. Taber, Vermilion, Princess, Conrad, Wainwright, Red Coulee, Lloydminster and others have produced about 1,300,000 barrels.

No. 5 is the Stony Creek field of New Brunswick, which has yielded 350,000 barrels to date, and is producing 25,000 barrels yearly.

In addition, hundreds of localities from the eastern tip of Nova Scotia, through the Gaspe Peninsula, westward through Ontario, and the Prairie Provinces, northward through the Northwest Territories, promise commercial production.

Throughout Canada's potential oil land, only about 3000 wells have been drilled, with fewer than half of them wildcats. From the geologists' viewpoint, the country has scarcely been touched.

In the last five years a large-scale investigation of Canadian oil prospects has ranged from the Atlantic Coast to the Foothills of Alberta and north to the MacKenzie River Basin, 1500 miles from the United States.

Around 70 percent of the activity—geological, geophysical and bore-hole drilling—is centered in Alberta. Active here are many international companies (Imperial Oil, representing Standard Oil

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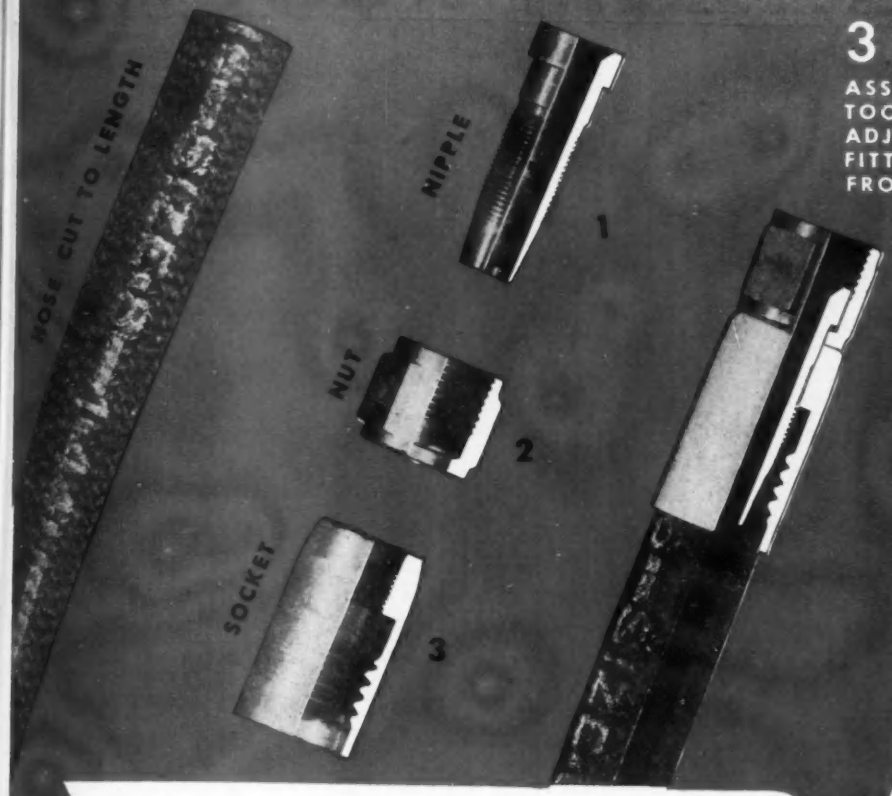

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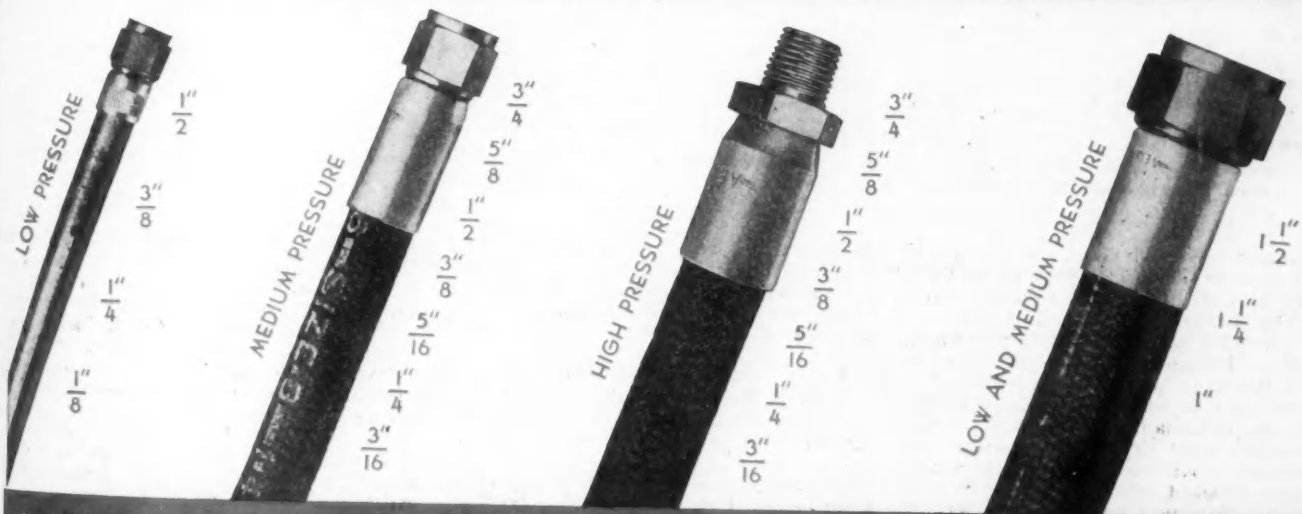

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Drilling Well Data for Western Canada

DISTRICT AND FIELD	NUMBER OF WELLS DRILLING JULY 1/44					NUMBER OF WELLS COMPLETED DURING: Six Months 1944					Year 1943							Year 1942						Year 1941					
							Oil		Gas	Dry		Oil		Gas		Dry			Oil		Gas	Dry			Oil		Gas		Dry	
	Totals	P.	W.	Rotary	Cable	Total	P.	W.	W.	W.	Total	P.	W.	P.	W.	P.	W.	Total	P.	W.	P.	P.	W.	Total	P.	W.	P.	W.	P.	W.
Alberta Foothills Belt:																													
Cealspur	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Folding Mountain	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Grease Creek	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..
Jumping Pound	1	..	1	1	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Livingstone Range	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Moose Dome	3	..	3	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Nordegg	1	..	1	1	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1
Pincher Creek	1	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ram River Area	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	1	..	..	..	..	..
Sullivan Creek	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1
Turner Valley	23	18	5	23	..	20	14	4	..	2	26	22	4	..	..	..	..	31	25	5	..	..	1	44	38	4	..	..	2
T. V. far North Extension	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	13	..	..	..	..	13	..	..	..	..	..	..
Walton Creek	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Watson Area	1	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Willow Creek	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1
Wildcat Hills	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	33	18	15	30	3	21	14	4	..	3	32	22	4	..	..	..	6	46	25	6	..	..	15	47	38	4	..	..	5
Central Alberta Plains:																													
Athabaska	1	..	1	1	..	..	..	..	..	..	3	..	1	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Bruderheim	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..
Buffalo Coulee	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	2	..	..	..	..	..	..
Castor	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..
Claysmore	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..
Dina Area	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1	..	1
Edgarton	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Fabyan	..	..	..	..	..	2	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Innisfree	1	..	1	1	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kinsella	1	..	1	1	..	..	..	..	..	..	11	..	..	7	..	..	4	3	..	..	3	..	..	5	..	..	5	..	..
Lloydminster	1	..	1	1	..	2	..	2	..	..	3	..	2	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Manville	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..
Pouce Coupe	1	..	1	1	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ruaylvia	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tovell	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..
Vermilion	1	1	..	1	..	8	6	1	..	1	41	25	5	..	1	8	2	15	3	2	..	5	5	16	5	3	..	1	3	4
Viking	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Wainwright	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..
Totals	7	1	6	7	..	14	6	3	1	4	62	25	8	7	3	8	11	26	4	2	3	5	12	23	5	3	5	2	3	5
Southern Alberta Plains:																													
Aldersyde	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Armelgra	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Blood Indian Reserve	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..
Brooks	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1
Conrad	3	..	3	3	..	4	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..
Crow Indian Lake	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Del Bonita-Twin River	2	..	2	..	2	1	..	1	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..
Erickson Coulee	..	..	..	..	..	1	..	..	..	1	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Eyremore	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..
Foremost	1	..	1	1	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Grassy Lake	..	..	..	..	..	2	..	..	..	2	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Grantham	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Herronton	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Hutton	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Jenner	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..
Kebo Dome	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Legend	..	..	..	..	..	2	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Medicine Hat	..	..	..	..	..	..	..	..	..	..	2	..	..	2	..	..	..	1	..	..	1	..	..	1	..	..	1	..	..	..
Milk River	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Monogram	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	2	..	..	..	..	..	..	..
Oyen	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	4	..	..	..	..	..	..	..
Pinhorn	1	..	1	1	..	2	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Princess-Steveville	2	..	2	2	..	1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	9	..	3	..	1	..	5
Purple Springs	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Red Coulee	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Rolling Hills	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..
Ross Lake	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Sandy Point	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Scope	..	..	..	..	..	2	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Skiff	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Suffield	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	3	..	..
Taber	4	..	4	3	1	9	..	5	..	4	10	..	3	..	..	..	7	4	..	1	..	..	3	..	..	..	..	..	..	..
Tilley	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	..	1	..	..	7	..	..	..	..	..	..	..
Wrentham	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	15	..	15	12	3	30	..	9	2	19	21	..	5	2	..	..	14	23	..	2	1	..	20	16	..	4	1	5	..	6
Alberta Totals	55	19	36	49	6	65	20	16	3	26	115	47	17	9	3	8	31	95	29	10	4	5	47	86	43	11	6	7	3	16

P means "Proved Location." W means "Wildcat."

Company (New Jersey), Standard Oil Company of California, Shell Oil of Canada; McColl-Frontenac, Canadian unit of The Texas Company, Gulf Oil Corporation, Socony-Vacuum Oil Company, Phillips Petroleum Company, Superior of California, and a large number of Canadian independents (British American, Anglo Canadian, Home Oil, et al).

Second most active area covers the maritime provinces of Nova Scotia and Prince Edward Island. Drilling in this area are Socony-Vacuum, Cities Service Oil Company, Lion Oil Refining Company of Arkansas, and the Canadian Independent, Nova Scotia Oil & Gas. These groups are also active in geological and geophysical investigation, along with Sun Oil Company and a number of others.

Seek Natural Gas

In New Brunswick and Western Ontario, current development is concerned largely with meeting needs for natural gas.

On the Gaspe Peninsula of Quebec, Continental Petroleum of Montreal is working on two wells, with its No. 2 acidizing to develop commercial production from three porous zones in the lower Devonian.

In Saskatchewan, the dominant operator is Imperial Oil (under its own name and through Norcanols Oil & Gas). The company has two heavy duty rotaries active, but in eight wells has not succeeded in obtaining more than promising oil and gas shows.

In Northeastern British Columbia, Socony-Vacuum and Phillips are engaged in geological and geophysical work but have done no drilling.

In the Far Northwest—with its 160,000 square miles of favorably regarded

MANY IMPORTANT PIPE LINES EQUIPPED WITH WALWORTH PIPE LINE VALVES

Here are some typical installations

These scenes are typical of the many important pipe lines where Walworth Pipe Line Valves are used. Above and at upper right are two views of Walworth Steel gear-operated Pipe Line Valves. The photo at the lower right shows a Walworth Check Valve for pipe line service.

On these and many similar installations Walworth Pipe Line Valves have maintained their reputation for reliable, efficient service.

In addition to the Steel Pipe Line Valves illustrated above, another popular valve for pipe line construction is the WALWORTH SEMI-STEEL BALL-BEARING PIPE LINE VALVE.

- Made of unusually high quality cast iron, having minimum tensile strength of 38,000 – 44,000 psi.
- Ball bearing hand wheel construction provides easier opening under pressure, maintains required speed of operation, and requires only half the turning force needed with non-ball bearing type valves.
- Body castings are produced in dry sand molds which give sharp corners and extraordinarily clean, close-grained, homogeneous castings.
- Valve trim is steel screwed-in seat ring, Stellite-faced; disc facing is hard bronze applied with torch.

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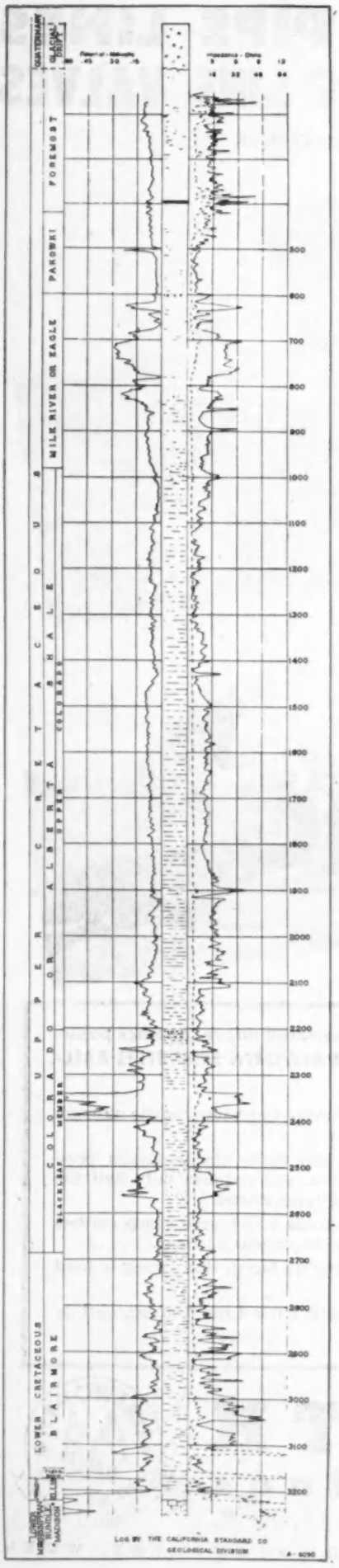
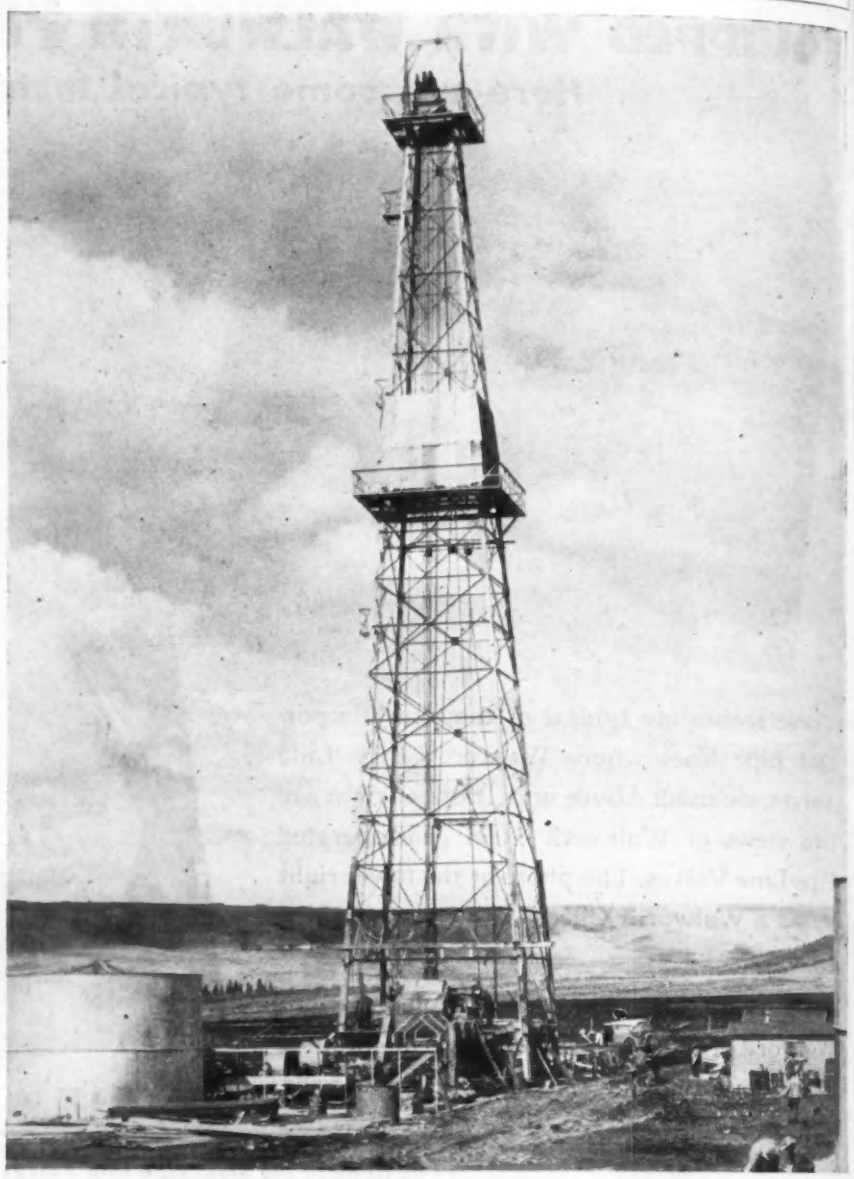


TABER FIELD LOG

A type well log of the Taber field, Alberta, Canada, is shown at left. Productive horizon in this field is the Taber sand, at the base of the Lower Cretaceous. Wells in the Conrad area, 23 miles southeast of Taber, produce in the Ellis sand, in the Jurrasic, immediately underlying the Taber sand.

Shell's Jumping Pound Well



Above is shown rigging up last May of Shell Oil of Canada's No. 4-24-J wildcat at Jumping Pound, in the Southern Alberta foothills. On November 24, 180 days after spudding, this well reached its Madison limestone objective at 9618 feet. Casing has been set and well will be drilled in and completed about mid-December. The well is the first wildcat in the Alberta foothills to reach its objective formation and confirm structure within the original depth estimate.

potential oil land—work has been limited by the distance from markets, and the high cost of development. Only operator has been Imperial Oil, With the backing of the United States Army, Imperial has developed the Norman Wells field it discovered in 1920, and has done considerable wildcat drilling and geological work.

Alberta Oil Discoveries

Alberta has been the center of oil exploration in Canada because of the Turner Valley field in its foothills belt; the establishing of a number of other oil-bearing areas by limited development elsewhere in the foothills and on the plains; the location of the famed McMurray tar sands in its northeastern corner; its favorable position in relation to a large and expanding market, and an administration which encourages exploration.

In September, Standard Oil Company of California made what is potentially the most important Alberta oil strike since the Turner Valley discovery. Its Princess-C.P.R. 8, on the Southern Plains, 125 miles east of Calgary, blew in with a flush yield of more than 1000 barrels per day from an 18-foot porous section between 3965-83 feet. Through small chokes, the well flowed 5167 barrels during September and October, with no evidence of water—bugbear of the plains. It is officially rated good for

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FORMATION AND CASING TESTING — JOHNSTON

Crude Oil Production and Producing Well Data for Western Canada

Name of District and Field	Discovery Year	PRODUCTION DATA—(In U. S. Barrels) Daily Average July 1. 1944	Total Production During First 6 Mos. 1944	Total Yearly Production During 1943	During 1942	During 1941	Total Production For All Years Thru 1943	OIL PRODUCING WELL DATA NUMBER AS OF JANUARY 1, 9144 Producing Depth Ranges (Feet)	Natural Flowing Wells	Wells Pumping	Wells Closed In	Wells Abandoned
Alberta	1904	22,822	4,153,570	9,213,379	9,841,054	9,615,521	61,235,322	.....	....	..	..	..
Armelgra	1943	.....	.....	462	.....	.....	462	3130	....	..	1	..
Del Bonita (incl. close localities)	1937	23	4,237	1,882	1,653	4,393	17,404	3900—5100	1	..	5	..
Dina	1929	.....	.....	200	2,780	2,894	37,352	1700—1800	....	..	2	2
Keho	1933	.....	.....	.....	.....	.....	955	3680	....	..	..	1
Lloydminster	1939	8	1,431	2,640	477	416	5,529	1750—2000	....	1	3	..
Moose Dome	1937	4	628	2,205	.....	.....	8,349	1553	....	1	1	..
Princess	1941	.....	.....	340	10,478	19,587	30,920	3260—3300	....	..	..	4
Ram River	1942	1	207	.....	.....	.....	.....	4340	....	..	1	..
Red Coulee (light crude)	1929	21	3,835	8,928	10,107	11,626	324,876	2400—2460	....	7	..	2
Skiff	1927	.....	.....	.....	.....	.....	8,298	2850—3100	....	..	..	2
Taber	1937	422	76,860	88,735	29,819	5,600	143,572	3200—3300	....	4	1	7
Tilley	1942	7	1,293	5,065	5,718	.....	10,783	3185	....	1	3	4
Turner Valley (Total)	1914	21,691	3,947,797	8,991,528	9,701,719	9,537,221	60,274,276	.....	254	..	..	..
Shallow Zone	1914	10	1,780	4,865	5,806	6,014	482,411	3200—3700	3	..	..	..
Limestone Zone (gas)	1925	129	23,566	46,465	27,650	27,096	8,190,449	3700—6800	36	..	..	..
Limestone Zone (oil)	1930	21,552	3,922,451	8,940,198	9,668,263	9,504,111	51,601,416	6800—9600	215	..	..	1
Vermillion	1939	597	108,642	93,258	63,793	22,051	183,147	1700—1850	....	36	2	1
Wainwright	1926	48	8,640	18,136	14,510	11,733	189,399	2150—2250	....	7	..	5
Northwest Territories:												
Norman Wells	1920	3,700	569,784	180,953?	37,521	14,119	324,002?	1700—2300	?	?	?	?
Total Western Canada	....	.....	.....	9,213,379	9,878,575	9,629,640	61,378,371	.....	....	..	..	..
TOTAL CANADA	....	.....	.....	9,376,235	10,065,585	9,810,891	100,761,913	.....	....	..	..	..

200 to 250 barrels daily under controlled flow through 11/64-inch choke, with gas-oil ratio only 635 cubic feet per barrel. Formation pressure appears to be about 1300 pounds.

The strike has precipitated a big lease play, with about 1,500,000 acres of oil rights taken up within a 40-mile radius. Three wildcats have begun drilling in the area, and many more are to get under way soon.

In July, Standard Oil Company of California made another important strike—completing its Conrad-Province 2 as a 125-barrel per day pumper of 25.6 API crude from the Ellis sand (Jurassic) between 2960-72 feet. The company has since completed a southeast offset with an initial yield on pump of 175 barrels, and has two rigs seeking the outlines of the pool. The discovery is on the Southern Plains, about 23 miles southeast of the Taber pool, opened by Standard in 1942, with yield from the Taber sand (Lower Cretaceous), overlying the Ellis.

The original Taber pool was delimited early this year by porosity pinch-out after completion of seven oil wells and several dry holes on the fringes of the pool. The seven wells by October 31 had produced 226,000 barrels and are now yielding 10-11,000 barrels monthly. Four miles west of this pool, however, an independent and Standard have completed four wells to establish another pool which may prove larger than the original discovery. Opened last summer, this pool has not yet been fully exploited. Oil gravity is from 20 to 23 degrees, compared with 18 in the original pool.

Vermilion Developed

On the Central Alberta Plains, the Vermilion pool—yielding 14-gravity oil from the Lower Cretaceous at around 1800 feet—has been developed by the Canadian National Railway and a number of independents. In September, 48 wells pumped 18,313 barrels, boosting the yield to 356,172 barrels.

About 25 miles east and south of the Vermilion field, drilling during the summer and fall of 1944 opened a Lower Cretaceous oil sand over a width of 6 miles and a length of 4 miles, with depths, yield and oil comparable with Vermilion.

Highlight of Alberta foothills development has been extensions to the Turner Valley pool. This year the field was extended to the north by completion of wells along the main body of limestone, similarly to the south. More important, however, was the completion of wells in a fault block of Madison lime immediately east of the main block of the structure, with commercial oil production at elevations up to 5500 feet subsea, 1200 to 1500 feet lower than the oil-water line along the main part of the structure. This "East side lime" is being explored by the Imperial Oil group.

Anglo Canadian and Home Oil recently completed a well (Home-Millarville 18) ¼ mile west of the northern limits of the productive area, obtaining a very heavy oil and gas flow with formation pressure 3000 pounds. This well, still on test, penetrated a slight uplift of the Madison west of the Main Uplift, and west of the oil-water line of the main structure. The heavy gas volume could represent a West Lime uplift gas cap, comparable with the gas cap of the main line, with its attendant opening of new possibilities for this relatively undeveloped section. The well, is lsd 7 18-21-3w5th, drilled the West lime from 8362 to 8640 feet, faulted to Fernie, and re-entered the main body of lime at 8650 feet, completing at 9084 feet.

The fault which cuts off the main Turner Valley limestone block on the east trends south and east for 19 miles, and takes a sharp swing west about 3 miles north of the most southerly wells in the field. South extension wells which penetrated the lime and entered the fault, passed into Blairmore and went no farther.

Believing the southwesterly fault does not necessarily mark the productive limit of the field, leading operators are deepening a main block edge producer in the south end. The well will be carried this winter through the fault in search of underlying limestone. The backers, Anglo Canadian, Home Oil, C. & E. Corporation, Okalta Oils and an Imperial Oil subsidiary, may prove still another important extension of the Turner Valley pool.

Drilling by major and independent interests is now under way on a dozen potential oil structures along the Alberta Foothills Belt.

Shell Oil Canada on November 24 confirmed its Madison limestone objective in its second Jumping Pound test, 4-24-J, at 9618 feet. This was the outstanding Alberta foothills development of the year, the Madison coming in shallower by almost 400 feet than anticipated, and 1665 feet higher than the Madison elevation in the company's Norman 1. Drilling was halted at 9640 feet and 7-inch casing set at bottom after electric survey, velocity and directional survey had been run. It will be drilled in and possibly completed by mid-December.

Paralleling the Turner Valley field a few miles to the west is the Highwood Uplift, with Madison lime on a series of narrow anticlines known to occur as shallow as 1000 feet. This area is being tested by Transcontinental, an independent, west of South Turner Valley, and by the Duke of Windsor and associates in the Pekisko Hills area, 14 miles south of Turner Valley.

About 25 miles southwest of Turner Valley, Phillips is drilling its initial Canadian well on the Sullivan Creek Anticline, a shallow structure where both Madison and Devonian prospects will be tested.

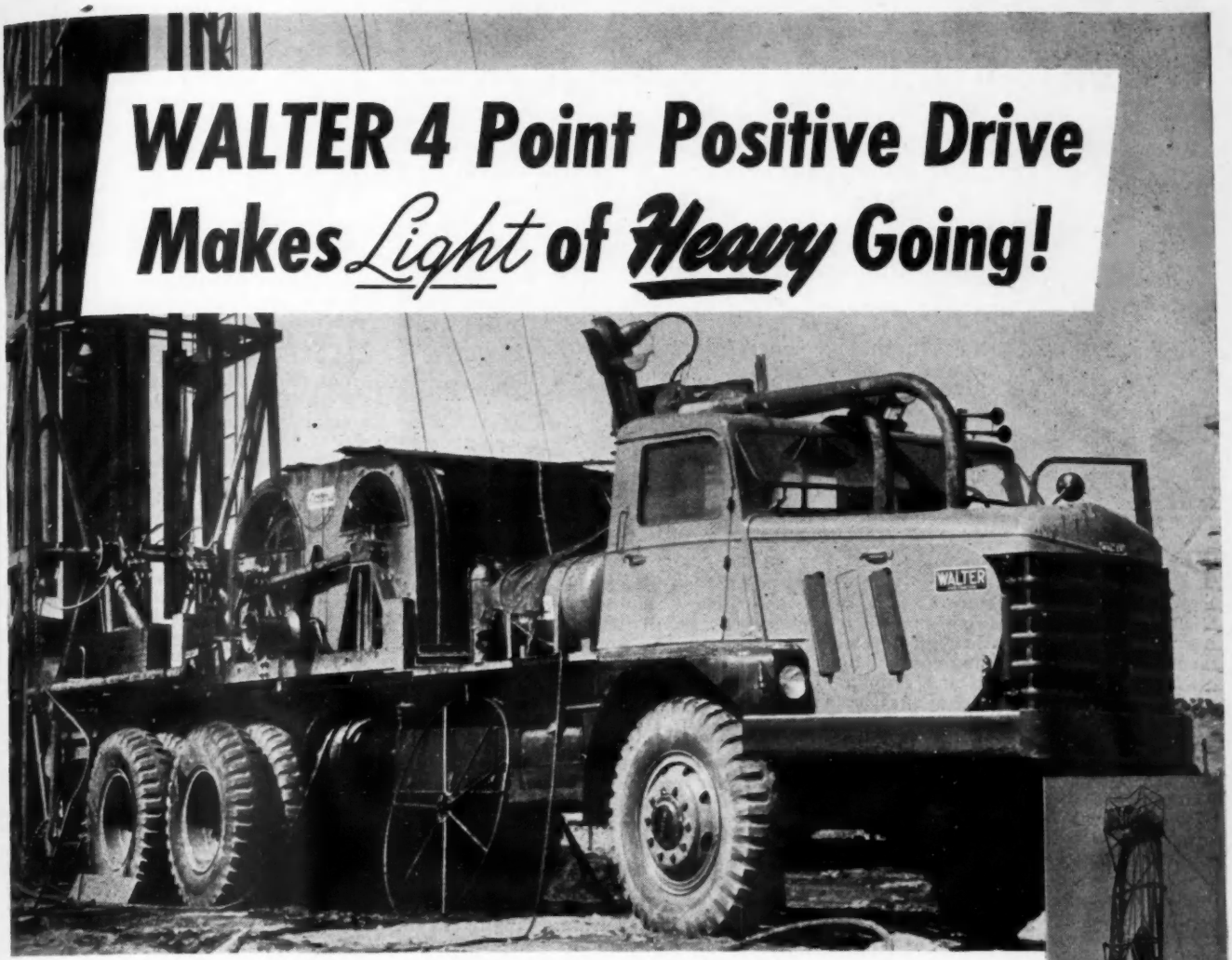
Thirty miles northwest of Turner Valley, two independents are drilling on the Moose Dome, source of Alberta's first Devonian Limestone production (8977 barrels over several years from Moose 2, an intermittent producer).

About 100 miles farther north along the foothills, three independent ventures are under way on the Ram River and Shunda Creek anticlines, Devonian limestone ridges where occurrence of light gravity oil has also been demonstrated.

Still farther north, in the Jasper Park area, Imperial Oil, Anglo Canadian and Home Oil are jointly testing Devonian prospects on the Folding Mountain anticline, while Imperial Oil is at 9400 feet in a deep test seeking the Madison limestone in the Coalspur area.

Another highlight of the oil search in the Alberta foothills belt is a joint aerial photographic reconnaissance of the area which commenced in July, 1944, backed by Imperial, Shell, McColl-Frontenac, Gulf, Socony-Vacuum and Rio Bravo (Superior).

WALTER 4 Point Positive Drive Makes *Light* of *Heavy* Going!



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War Advances Development In Northwest Canada

Canol projects including Alcan highway and roads tributary encourage reconnaissance geological work in Alaska and Northwest Territories where Norman Wells has already emphasized great possibilities.

By C. T. FILLAN
Western Exploration Company, Ltd., Calgary, Canada

POTENTIAL oil reserves of great importance in northwestern Canada and northern Alaska have been brought much nearer to development through developments of the war, including construction of the Alaska highway and tributary graded roads, carrying out of the Canol project, reconnaissance geological work in the Canadian areas made accessible by the roads, and preliminary geological investigation in the northern portion of Alaska.

Development of the Norman Wells field, Northwest Territories, Canada, has emphasized the very promising possibilities of the Mackenzie River basin, although that field so far is the only major producing area north of Turner Valley. Meanwhile, pioneering geological investigation along the Alaska highway in British Columbia and Yukon territory has pointed to possible important oil fields in those now accessible areas. Farther north, in central Yukon, at the head of the Peel River, a promising large sedimentary basin has been brought within a circle of possible means of access. In northern Alaska, between the Brooks Mountain range and the Arctic Ocean, further geological work has been initiated by the United States government in a large region of favorable sedimentary conditions, marked by numerous oil and gas seeps.

Under the Canol project the Norman Wells field has been developed by Imperial Oil Limited from a small area of 20 acres with 4 wells producing 300 barrels per day to an area of more than 3700 acres with 54 wells producing around 4000 barrels daily of high quality crude. The limits are not yet defined, and subsequent development may call for a pipe line of size adequate to transfer the oil to tidewater at Skagway.

Oil Seepages

Discovered in the summer of 1920, Norman Wells field was opened by a wildcat drilled near oil and gas seepages along the east bank of the Mackenzie River, 51 miles below (north of) Fort Norman. Those seepages were first reported by Alexander Mackenzie in 1792. No surface evidence of any fold or dome exists. The producing horizon consists of a big lens of porous reef limestone, productive throughout a vertical range of 700 feet. The porosity of this limestone decreases in all directions away from the field, preventing migration of oil up dip and thereby forming the oil trap. It is supposed that the porosity is due either to coral reef conditions existing in the shallow sea in which the limestone was formed, or to leaching of the upper part of the limestone when it was formerly an eroded surface. Similar conditions are considered as highly probable of continuing intermittently in a belt running west northwest and east southeast, roughly paralleling the course of the Mackenzie River.

Excellent results follow in the wake of the large construction projects completed under both American and Canadian auspices throughout the northwest. Not only has the hope of an Alaska

IN the course of 15 months' engineering work on the Canol Project, the author of the accompanying article experienced a winter automobile drive from Edmonton to Fairbanks, through areas that promise to furnish important oil fields.

Possibilities of important oil production in northern Alaska, touched upon only briefly in this article, have been discussed in some detail in The OIL WEEKLY in recent months. (See issues of October 16, 1944, page 56; July 24, 1944, pages 66-67; April 3, 1944, page 52.)

In connection with the areas indicated on the accompanying map as favorable for oil prospecting in Alaska, Mr. Fillan wishes to acknowledge that the source is Philip S. Smith, chief Alaskan geologist of the United States Geological Survey, who contributed an article on "Possible Future Oil Provinces in Alaska," published by the American Association of Petroleum Geologists.

Fillan also wishes to acknowledge that the source of his information regarding the cause and origin of the oil accumulation at the Norman Wells field is Donald C. Birch, petroleum geologist with General Petroleum Corporation, Casper, Wyoming.

The OIL WEEKLY also has made some additions to Mr. Fillan's map based on authoritative information.

Below—Aviation will doubly stimulate oil development in the Canadian Northwest and Alaska. It will make a market for petroleum products as air lines through the region handle increasing traffic, and, too, planes will make the remote drilling sites more accessible. In the past several years, geologists and prospectors for new sub-Arctic oil have been taken into likely sites by air with all their supplies. The canoe, below, is to be lashed onto the pontoons of a United States Army cargo transport, at work on the Canol project in Canada's Northwest Territories. (Canadian Government photo, released by National Film Board.)

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MAP OF NORTHWEST CANADA and ALASKA

WESTERN EXPLORATION COMPANY LIMITED

highway become a reality in the shape of a 1600-mile two-lane pike equipped with steel bridges, but its course traverses what geologists believe to be potentially one of the most attractive areas, structurally, for the explorer for petroleum in the northwest. Tribute is due the Geological Survey of Canada for the fine work done in 1943, particularly for its reconnaissances along the Liard, Fort Nelson and Beaver rivers and along the Alaska highway from Fort St. John to Fort Nelson.

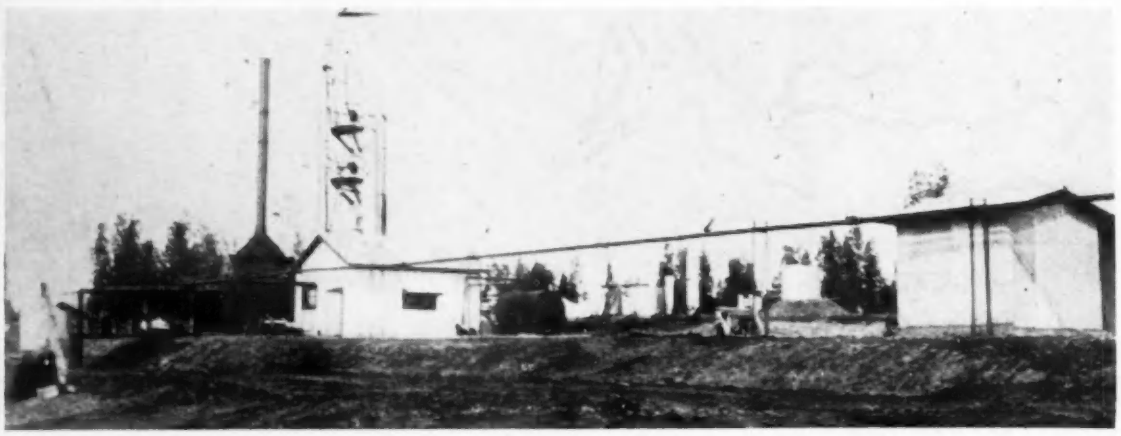
Notably attractive, considering its comparative accessibility, is an area west of the highway between Beatton river and Prophet river, where a belt 60 miles long by 5 to 25 miles wide was mapped by Dr. Hage. Several anticlinal folds were examined, one of a reported length of 30 miles, with limbs showing dips averaging 30 to 60 degrees. "It seems reasonable to suppose," runs the Hage report, "that this and similar folds will continue to depth and be present in the underlying Triassic and Palaeozoic strata." Possible reservoir beds were found to exist, and closure was demonstrated by geological mapping. The area is less than 650 miles northwest of Edmonton by highway.

This season Phillips Petroleum Company, an American concern, has been

in the field in Northeastern British Columbia and Southeastern Yukon. It is strongly felt, however, that lease regulations of the British Columbia government are entirely inequitable; at least one representative of a major American company has said that his company would, under no circumstances, engage in development in British Columbia while existing regulations remain in effect.

Oil seepages are known to exist in the vicinity of the confluence of the Dease and Liard rivers and 40 miles from that point an oil seepage occurs in the bank of the St. Francis river. Both areas are within easy distance of the highway, Watson Lake airport and pipe line to Whitehorse and tidewater at Skagway.

In 1921, Dr. Charles Camsell, deputy minister of mines and resources, drew attention to an area particularly favorable for exploration. Wrote Dr. Camsell in his work on the Mackenzie River Basin, "From Bear river to the point where Wind river leaves the mountains, sandstone and limestone appear in a succession of gentle anticlines and synclines . . . Almost in the center of this area lies a large basin of over 500 square miles, occupied by slightly disturbed Tertiary rocks. This basin, which is almost completely enclosed by foothills, lies between the Wind and Bonnet Plume rivers and extends southward some fifty miles from the Peel." Aerial



Before installation of the 3000 barrels per day refinery at White Horse, Norman Wells oil field's market outlet was limited to the requirements of the small refinery of Imperial Oil Company at the field, on the Mackenzie River, shown here. This refinery was put in operation in 1940, with capacity of 840 barrels of crude oil a day, and alkalate was taken to the refinery for blending in making 87-octane aviation gasoline.

photographs flown by the United States Army check Dr. Camsell's work, indicating existence of many large anticlines in the Tertiary and Cretaceous sediments extending over a large area.

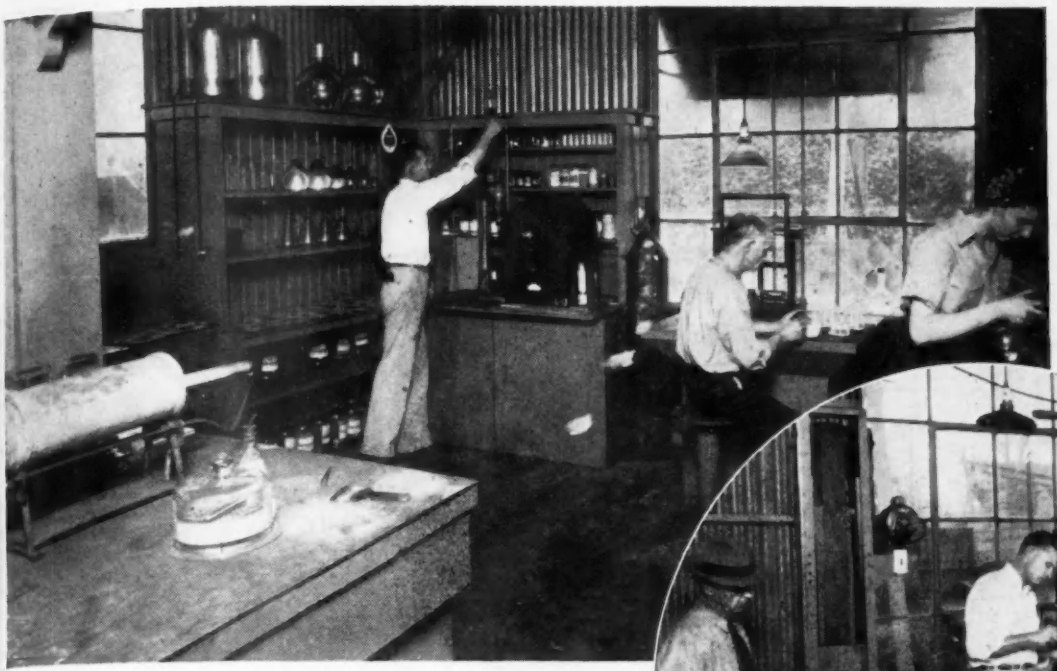
Equipment and supplies could be brought into the Wind river area by barging down the Mackenzie to Aklavik and up the Peel, which is also navigable for light draft steamers as far as Wind river, a distance of 250 miles from Aklavik. The United States Army sponsored construction of several hundreds of steel and wood barges of 50, 100 and 300 tons capacity, as well as a number of powerful tugs which were used on the Mackenzie river during the 1943 season, to freight equipment, pipe and supplies for Imperial Oil Limited. It is expected that the Canadian government will purchase these rather than let them go back to the United States. Here would be a practical and profitable means of subsidizing, by way of low cost transportation, the difficult and hazardous enterprise of opening up the unexplored regions of the Northwest. Operation of this essential fleet would afford employment to merchant seamen and other trades and would be a strong stimulus to northern exploration.

An important and necessary factor would be construction of a tractor road from Norman, up the valleys of the Carcajou, Arctic Red, Peel, Ogilvie, and Tatonduk rivers to the international boundary, where it would be met by an extension of the Fairbanks-Circle highway. This road would give access to heavy freight from Alaskan seaports, from the Mackenzie river and from the Alaska highway. Construction need not be unduly costly. A route following the line indicated would not exceed a summit of 2500 feet above sea level and would traverse a country of light precipitation, very much easier from an engineering standpoint than the Norman-Whitehorse route with summits exceeding 5500 feet and subject to heavy rains.

Specific instructions were included in the Army directive covering the Canol project for a survey of the best pipe line route from Mackenzie river to Fairbanks. Estimates were called for in the early spring of 1944 looking to construction of a 10-inch to 16-inch pipe line. Only political considerations both at Ottawa and Washington prevented execution of the plan for construction of this larger pipe line along the route described, after completion of the Whitehorse line.

A special urgency is attached by Canadians to exploration for petroleum in the far Northwest, for the reason that the advance of commercial aviation in the early years of the approaching peace is going to be so great that the extent of Canada's ascendancy as a world power will depend in large measure upon her position as a producer of aviation fuel. Particularly incumbent upon Canada is the task of providing at an early date a constant and adequate supply of petroleum products in land areas beneath the Northwest Staging Route—to be ready for the time, not far away, when, in the words of Robert Hinkley, "great fleets of passenger and freight planes are plying between this country and South America, Africa, Europe and the Orient."

Formidable impediments will continue to stand in the way of development of oil fields in the rugged and frozen regions of Northwestern Canada and Alaska. Difficulties include remoteness from sources of supply, only partly ameliorated by transportation routes opened up during the war; mountainous country; sub-zero temperatures in winter; and mosquitoes and mud in summer. The tractor with pipe laver, shown here handling pipe along the Canol project near the Alaskan and Yukon Territory border, is working in muskeg and mud, in a spruce forest setting. Bad mud conditions, due to muskeg and permanent ice conditions as well as rain, caused trouble in numerous phases of the work involved in the Canol project.



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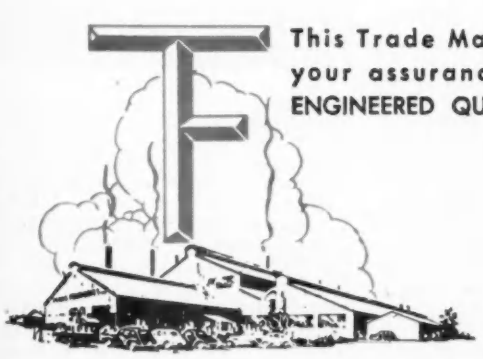

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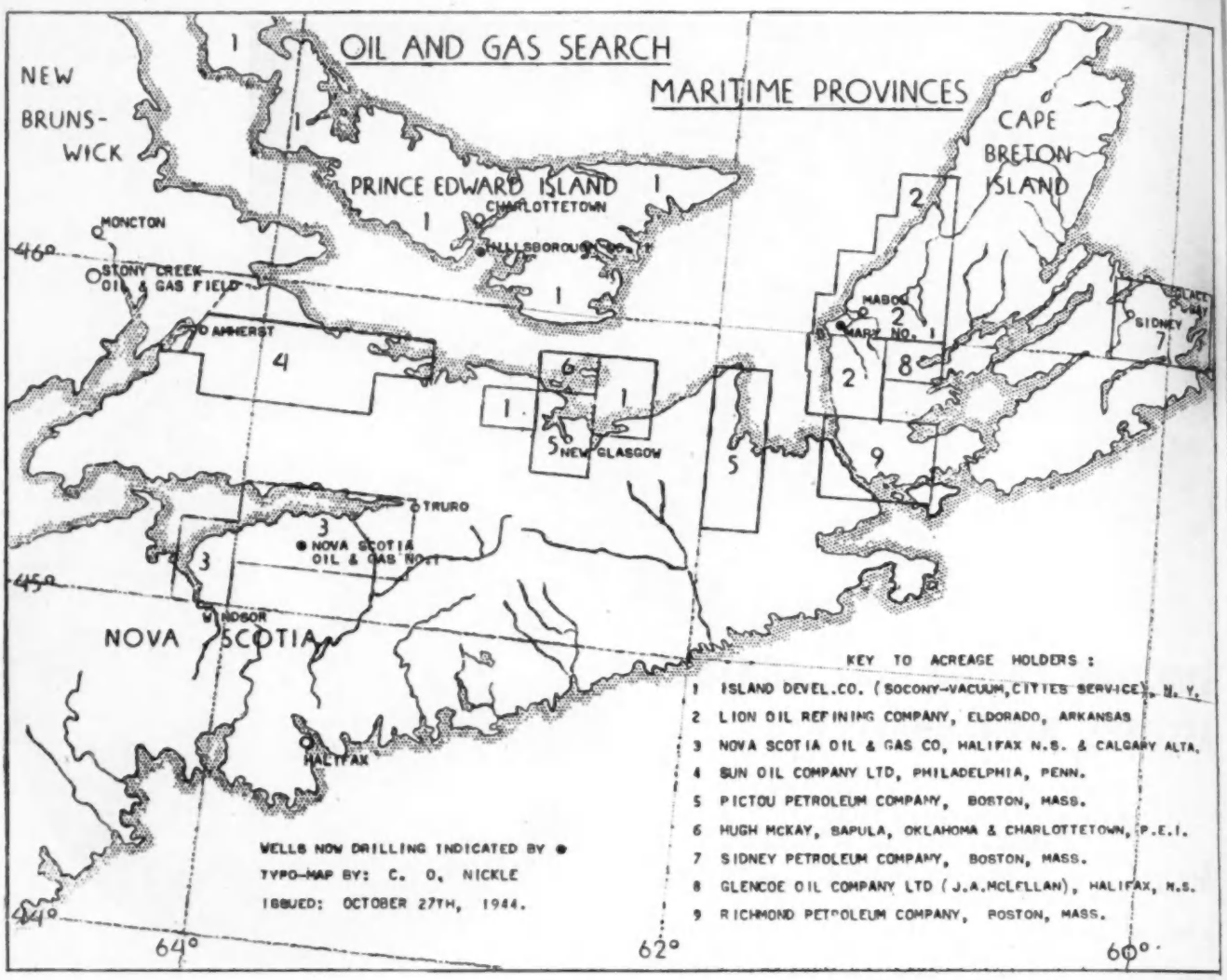

Maritime Provinces Favored In East Canada Prospecting

Drilling follows extensive preliminary development in Nova Scotia and on Prince Edward Island; studies made of Gaspe Peninsula and of Northern Ontario; areas are being further developed

By C. O. NICKLE
Staff Representative in Canada

REFLECTING intensifying efforts to discover new major sources of oil on the oil-hungry North American continent, American and Canadian companies have embarked on a major exploration program in Canada's Atlantic outpost provinces, Nova Scotia and Prince Edward Island.

The maritime province oil search ranks second in Canada to the big program under way in Alberta. As in Alberta, the presence of oil and gas has been demonstrated in the maritimes by numerous surface seepages, although only one small field has been placed on production in this part of Canada.

Meanwhile, other development in eastern Canada includes further prospecting on the Gaspe Peninsula, southern Quebec, based on oil seeps and non-commercial production of earlier wells, besides field development and limited exploration in and around the established oil and gas producing areas of southern Ontario. The Moose River basin, James Bay district of northern Ontario, also is receiving attention.

At least nine major and independent groups are participating in the maritime search, with good prospects of others joining in, according to a survey by the writer.

Upwards of 4,500,000 acres of provincial oil and gas rights have been taken up under lease or permit of which nearly 3,000,000 are in Nova Scotia and its coastal waters. About 1,500,000 acres cover Prince Edward Island and its coastal waters. Development on these holdings is rapidly getting into full swing. Geological and/or geophysical investigation has been completed over the bigger part of the present holdings. Three drilling rigs are in operation, with more slated to go into use by spring.

Outstanding among current maritime drilling operations is the Hillsborough 1, million-dollar joint venture of Socony-Vacuum Oil Company and Cities Service Oil Company. This wildcat, in Hillsborough Bay, 8 miles south of Charlottetown, capitol of Prince Edward Island, is on a mile-long pier off Governor Island. Within a few months it is likely to become the deepest well yet drilled in Canada. It is making hole with heavy duty rotary below 10,000 feet and may go to 14,000 feet to reach the potential oil zones of the Horton Series (lower Carboniferous) and the upper Devonian.

This well is being drilled on the basis of seismic and surface studies, and

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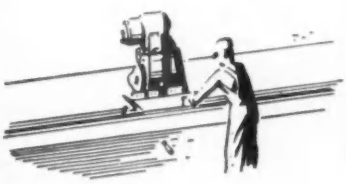
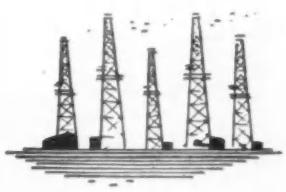


In types—it's available for either top or bottom anchoring . . . has sleeves of either "Cor-Loy" or "Supreme" alloy steel . . . comes in 5, 7, 9, 10, 12, and 16-foot lengths and four diameters . . . with either single or double valves.

In operation—it's fast to install, easy to pull and pumps efficiently in both medium and large volume wells at all depths.



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Crude Oil Production and Producing Well Data for Eastern Canada

PROVINCE and FIELD	Discovery, Year	PRODUCTION DATA (IN U. S. BARRELS) Daily Average July 1, 1944	Total Production During First 6 Mos., 1944	Total Yearly Production During 1943	During 1942	During 1941	Total Production For All Years Thru 1943	OIL PRODUCING WELL DATA NUMBER AS OF JANUARY 1, 1944 Producing Depth Ranges (Feet)	Wells Pumping
Ontario, Total All Fields	1862	381	67,719	132,492	143,846	158,919	39,034,158	150–400	1,728
Mooré	....	....	.....	332	806	.....	.....	.....	7
Romney Tp	....	....	.....	54	81	.....	.....	.....	2
Dover	....	....	.....	9,322	8,494	.....	.....	.....	8
Sarnia	....	....	.....	305	237	.....	.....	.....	18
Plympton	....	....	.....	26	24	.....	.....	.....	2
Petrolia and Enniskillen	....	....	.....	45,308	51,917	.....	.....	.....	540
Oil Springs	....	....	.....	27,270	27,369	.....	7,946,500	.....	752
Oxford Tp	....	....	.....	*	*	.....	.....	.....	17
Dawn	....	....	.....	126	327	.....	.....	.....	1
Thamesville	....	....	.....	1,664	1,979	.....	.....	.....	7
Aldborough	....	....	.....	*	*	.....	.....	.....	1
Raleigh	....	....	.....	†	.....	.....	.....	.....	3
Bothwell	....	....	.....	24,244	26,054	.....	.....	.....	172
Warwick	....	....	.....	5,967	6,524	.....	.....	.....	10
Euphemia	....	....	.....	114	270	.....	.....	.....	14
Metcalfe	....	....	.....	.....	‡	.....	.....	.....	5
Brooke	....	....	.....	.....	77	.....	.....	.....	1
Mosa	....	....	.....	16,327	19,209	.....	.....	.....	136
Dunwich	....	....	.....	1,422	358	.....	.....	.....	19
Onondago	....	....	.....	11	120	.....	.....	.....	12
Chatham Tp	....	....	.....	.....	.....	.....	.....	.....	1
New Brunswick (Stony Creek only field)	1909	63	11,221	25,405	26,879	22,332	344,425	1900–3100	20
Total Eastern Canada	.....	444	78,940	157,897	170,725	181,251	39,378,583	.....	1,748

* Included in Bothwell. ‡ Included in Warwick. † Included in Dover.

is on the indicated crest of a structure located 20 years ago by Hugh McKay, a Nova Scotia geologist. McKay obtained a concession from the province covering the structure, and in 1927, Cities Service drilled a well on Governor Island to 5970 feet. This apparently down-flank location was not carried to the prospective oil horizons. In 1942, Socony-Vacuum was brought in by McKay, and a joint Socony-Cities Service survey and drilling program was instituted. The program is being carried out through Island Development Company.

Cape Breton Island

Second rig to get underway is a heavy duty rotary operated by the Lion Oil Refining Company of El Dorado, Arkansas. This company, following intensive geological and seismic investigation of the Cape Breton Island section of Nova Scotia, initiated drilling last year at its Mac 1, south of Mabou Inlet. The well was abandoned at 5579 feet without reaching its objective sands. A second well, Mary 1, has been started 1¼ miles northwest and is drilling below 3000 feet, with the objective horizon, the Ainslee sand in the top of the Horton series, expected at 6300 feet.

The third current drilling operation is that of the Nova Scotia Oil & Gas Company, near Kennetcook Corners, in central Nova Scotia, 40 miles north of Halifax. Its initial well was spudded in October with cable tool equipment. Objectives are the sands of the Horton series of the lower Carboniferous, indicated at 3000 feet. The well is testing one of several structures underlying the company's holdings, outlined by Professor Merle F. Bancroft, chief of the geological department at Acadia University. The project is a joint operation of Nova Scotia business men and Anglo-American Oils, Lt., which has interest also in the Turner Valley and Taber districts of Alberta (Northend Petroleums, Taber-Pinhorn Oils).

Acreage Under Reservation

Dominant acreage position in the maritime province search is held by Socony-Vacuum-Cities Service. Through Island Development Company, they hold a reservation from the Prince Edward Island government covering the island and adjacent coastal waters. Prince Edward Island reserves a 5 percent royalty on production. In addition, Island Development holds reservations from Nova Scotia totalling about 210,000 acres in Pictou County and adjoining waters. This is subject to Nova Scotia's "sliding scale" royalty (1 percent on wells producing 20 barrels or less per day, ranging up to 10 percent on wells producing 100 barrels or more per day) and a gas royalty of ½ cent per 1000 cubic feet sold or used off the lease.

Lion Oil Refining Company holds under reservation from Nova Scotia 650,000 acres in Iverness and Victoria Counties of Cape Breton Island, and in the coastal waters to the west, subject to the usual Nova Scotia royalties.

Nova Scotia Oil & Gas Company holds under reservation 553,000 acres in Hants and Colchester Counties of central Nova Scotia, and in Cobequid Bay between these counties.

Sun's Holdings

Sun Oil Company of Philadelphia, Pennsylvania, has reservations of 500,000 acres in Cumberland County in northwestern Nova Scotia, and adjoining coastal waters. Sun has completed geological investigation and is expected to begin drilling operations next spring.

Pictou Petroleum Company of Boston, Massachusetts, has taken up two blocks totalling 415,000 acres. One block of 140,000 acres is in Pictou County between Island Development holdings, and the other of 275,000 acres is in the northeastern end of the Nova Scotia mainland in Antigonish and Guysborough Counties.

Richmond Petroleum Company, also of Boston, holds about 275,000 acres extending from the east end of the mainland into Cape Breton Island, tying on to the south of the Lion Oil block. Another Boston company, Sidney Petroleum Company, holds 275,000 acres in the Sidney and Glace Bay area of southeastern Cape Breton Island. Glencoe Oil Company of Halifax, holds about 70,000 acres on Cape Breton Island, adjoining the Lion block south and east. Hugh McKay holds 70,000 acres extending off the mainland to include Pictou Island and smaller islands and adjacent waters, tying on to the Island Development and Pictou Petroleum blocks in Pictou County.

Stony Creek Field

The maritime provinces' only oil field is a small one, developed subsidiary to a gas field at Stony Creek, 9 miles south of Moncton, New Brunswick. The oil-bearing section of the field has been only partly developed, but by the end of 1943 had produced 344,425 barrels of a light 37.1 gravity, paraffin-base oil, and is currently producing 25,000 barrels yearly, principally during the summer months. The gas-bearing section of the field produced 20 billion cubic feet of gas by the end of 1943, is currently yielding 600-650 million cubic feet annually.

The 1900-acre field has 58 wells, 38 gas wells and 20 wells producing some crude oil. Producing depths range from 1900 to 3100 feet. The output is from a series of six sands in the Albert series of the Lower Carboniferous (corresponding to the Horton series of Nova Scotia). Owner of this field, New Brunswick Gas & Oil Company of Edinburgh, Scotland, has two light rigs in steady operation in the gas section, its oil search having been suspended three years ago due to urgent need of increased gas supplies for the City of Moncton.

Gaspe Peninsula Wildcats

During 1944, Continental Petroleums, Limited, continued wildcatting started in 1943 to the west of Gaspe village and harbor, northern Gaspe Peninsula. In the last summer of 1944, the company was drilling below 2060 feet in its No. 2 well. Drilled 113 feet from a well, completed nearly 50 years ago and still yielding small non-commercial production of high gravity oil from 2058 feet, this modern test bailed several barrels of oil that came from shale at 1920-1958 feet and at 2036 feet, and was

Drilling Well Data for Eastern Canada

Name of District and Field	Wells Drilling July 11, 1944	NUMBER OF WELLS COMPLETED DURING 1943 Total	Oil	Gas	Dry
Ontario:					
Oil Fields, Total	?	18	1	..	17
Warwick	....	4	..	..	4
Thamesville	....	1	..	..	1
Raleigh	....	4	1	..	3
Onondago	....	2	..	..	2
Other Fields	....	7	..	..	7
Ontario:					
Gas Fields, Total	?	248	..	145	103
Haldimand Co.	....	128	..	90	38
Kent Co.	....	19	..	10	9
Malahide	....	4	..	..	4
Norfolk Co.	....	46	..	19	27
Welland Co.	....	16	..	10	6
Other Areas	....	35	..	16	19
Ontario:					
Wildcats	5	5	..	1	4
Total, Ontario	?	271	1	146	124
New Brunswick	?	?	..	..	..
Total E. Canada	?	271	1	146	124

WORLD'S DEEPEST WELL

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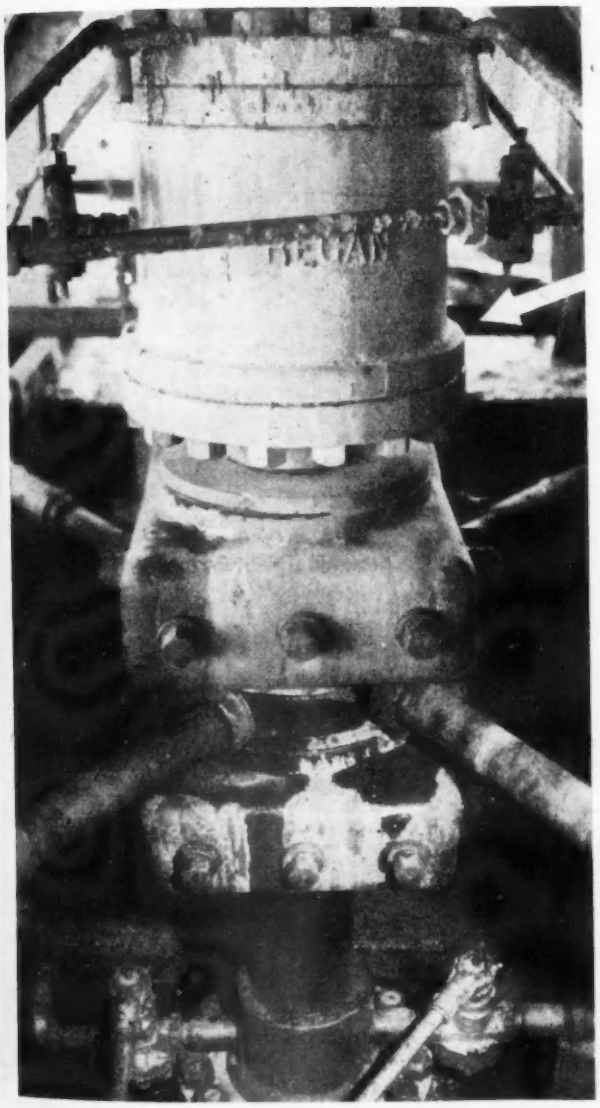
Regan Crown Block

Regan Traveling Block

Regan Blowout Preventer

Below—Regan Type K Blowout Preventer



Regan Crown & Traveling Blocks

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New York Office: 17 Battery Place, Geo. R. Woods, Mgr.

Canada's maritime provinces are the scene of an active oil exploration program, involving geological and geophysical work over some 4.5 million acres of rights acquired from the governments of Nova Scotia and Prince Edward Island. Three drilling operations are now under way, one backed jointly by Socony-Vacuum Oil Company and Cities Service Oil Company, one by Lion Oil Refining Company of Arkansas, and the third by Nova Scotia Oil & Gas Company. Photo shows spudding in of the Nova Scotia Oil & Gas venture in Hants County in October. Mast mounted cable tool rig is being used, with objective the Horton series. Anticipated depth to completion is 3000 feet.

due to test those zones after drilling deeper.

The same company's No. 1 well, four miles east of No. 2, and on Galt Brook dome, drilled in 1943 to 2124 feet before cold weather stopped work, was not reported making additional hole this year, although projected as an 8000-foot test. The well showed oil and gas near the surface and in a fractured zone at 833 feet, the company reported. The concern holds 85,000 acres on Gaspe Peninsula.

James Bay District

Several months ago MacDyke Oil & Mining Industries, Ltd., was proceeding with plans to test surface shale deposits and to do exploratory drilling to about 1500 feet in the Moose River basin, James Bay district, northern Ontario. The oil-bearing shales under study outcrop about 50 miles above the mouth of Moose River, which empties into James Bay. The shales are of Devonian age and are associated with sandstone beds that have good reservoir characteristics over a large area of regional and local closure. Rocks of Silurian age are present below the Devonian section, and from the bedrock surface south and west of the Moose River basin.

Fields of Ontario

In southern Ontario, emphasis has continued on production of natural gas, and during 1944 as in 1943, drilling has been predominantly in the established gas fields. However, some drilling has been maintained also in and adjacent to the oil fields of the region, between Lake Erie and Lake Huron. Data available at the middle of 1944 indicated that more than 200 wells would be completed during the year in the gas fields, including dry holes; in 1943 there were 248 completions, including 145 gas wells and 103 dry holes.

In the oil fields, development was falling short of the record for 1943, when 18 wells were completed, including 17 dry holes and one oil well. However, wildcatting has been more extensive this year than last, when five exploratory tests were completed at distances of five to 15 miles from producing fields, including four dry holes and one gas producer four miles west of Bothwell field. In the middle of 1944 five wildcats were drilling in southern Ontario at distances of two to ten miles from established fields, while earlier in the year an outpost test, half mile south of the Bothwell field, was completed for two barrels initial daily production at 380 feet.

In the first eight months of 1944, the oil fields of Ontario produced 89,621 barrels, an average of 367 barrels per day, a slight decrease from the 91,816 barrels produced in the corresponding months of 1943. The production is from approximately 1725 oil wells in about 20 pools, coming from depths of 200 to 400 feet. Several oil and gas fields have been discovered in recent years, and various areas in the district are considered good prospects, on the basis of subsurface geology and oil and gas showings in wells.

(Editor's Note: Comprehensive basic information on Eastern Canada's oil and gas fields and future possibilities, including geological and statistical data, appeared in a special article in THE OIL WEEKLY of July 17, 1944, pages 17-24.)

Government's Exploratory Activities Adds to Oil Reserves of Peru

Oil production in Peru reached a peak of 17,593,000 barrels in 1936, at which point a decline set in, culminating in an output of only 11,922,000 barrels in 1941. This lowered rate, plus the reduction of imports due to war conditions, created a situation that led to the reorganization of the petroleum industry by the government.

Drilling of additional wells in the old producing areas within the departments of Piura and Tumbes and use of modern techniques in the operation of old wells halted the decline, so that production for 1942 rose to more than 13,500,000 barrels, and to approximately 15,700,000 barrels in 1943.

Meantime, the Peruvian government inaugurated an ambitious program of air mapping, geological and geophysical surveys and test drilling for undeveloped areas under government auspices, with the goal of establishing a flourishing industry. Results to date favor realization of this goal. Favorable areas along the east flank of the Andes have been made national reserves by decree, and the government has taken over other areas in the Lake Titicaca and northern coastal regions.

The first wildcatting venture sponsored by the government resulted in what promises to be a major discovery at Constancia, midway between the northwest coastal fields of Lobitos and Zorritos. Four wells have been completed in the field, with production 1200 barrels per day. The oil is piped to the Villar refinery and the docks at Talara.

Two test wells are under way in the vicinity of Pirin, in Puno, and locations have been selected for other wildcats in the Ucayali River valley north and south of the Agua Caliente field. Promising structures have been mapped in the Sechura Bay area of Piura, where drilling will be undertaken as soon as equipment is obtained from the United States.

Development of the Constancia field, opened in April, is receiving maximum attention in the allocation of drilling equipment and supplies. Two rigs will be kept in operation for the remainder of the year, after which three or four more are due to be delivered.

Testing of three most promising structures in the Sechura Bay area, farther down the coast, is to be started before the middle of 1945. These structures are rated A-1 prospects by American geologists familiar with the area.

On the basis of the Constancia discovery and the rejuvenation of production in the Lobitos pools, production in Peru during 1944 is expected to reach an all-time high of at least 21,000,000 barrels. It is estimated that the country's production for the first eight months of 1944 was close to 15,000,000 barrels.

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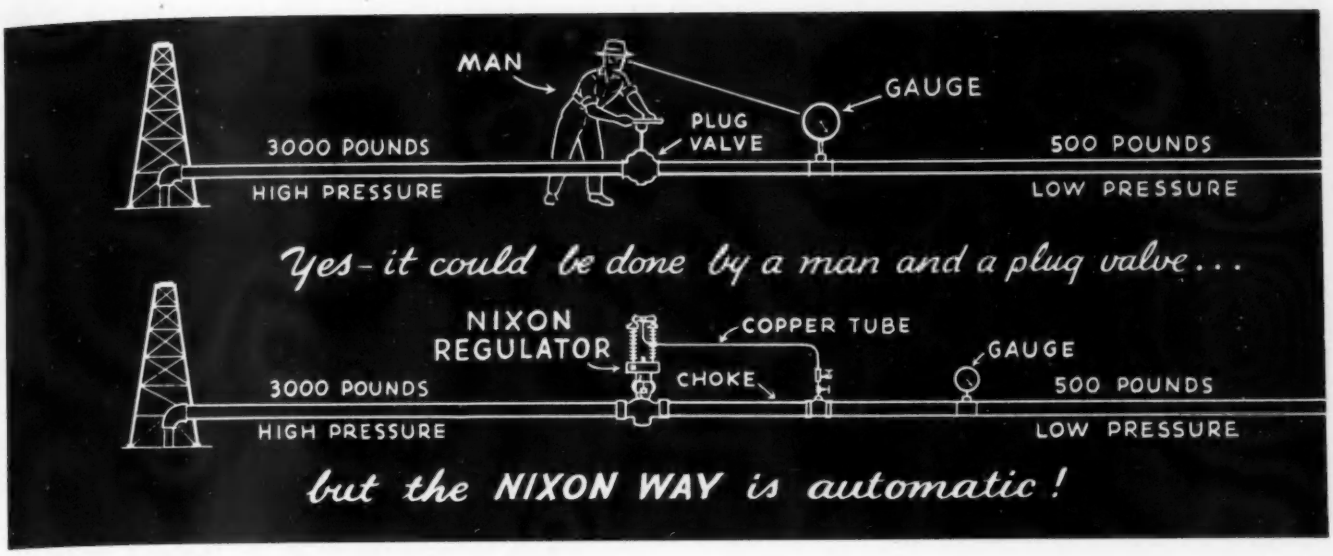

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General view of the Bibi Eibat field, one of the more important producing areas of the famous Baku region. Most of the derricks shown are located in a section of the field in which the Baku Bay of the Caspian Sea was filled in.

Russian Developments in Both Producing and Refining Are Important Despite War

Technological research responsible for various important steps reported in industry. Intensive training given exploratory specialists, drilling crews, equipment men and engineers. Hundreds of new fields found especially in "Second Baku" as U.S.S.R. pursues aim to produce its own oil. Many bottlenecks handicap nation's activities.

IT IS evident that significant oil developments are taking place in Russia, and that producing and refining operations in that country are at an all-time high. It may safely be estimated that during 1944 the Soviet Union will produce approximately 275,000,000 barrels of petroleum, and that reserves have been considerably boosted in the meantime.

Since the beginning of the current year, the Soviet government has seen fit to release more information than heretofore concerning that union's exploration and oilfield development activities. Although these reports require careful study for correct interpretation, it may be gathered that, as a whole, the Russians are gratified with the progress made along oil lines, and at the same time recognize the many problems yet to be met. Despite the difficulties of meeting wartime demand for producing and transporting crude oil and products, the Soviet Union has found itself capable of carrying on exploration and research projects and, at the same time, maintaining production at a high level.

Refineries in Full Operation

In spite of increases registered, the program as a whole has been hampered seriously by natural obstacles encountered by a nation fighting a total war upon its own soil. Foremost of the many problems with which the Soviet Union was confronted, was the rapid evacuation and relocation of the oil industry from areas menaced by the German advance into Russia, to more remote regions toward the center and the eastern parts of the nation. The size of this undertaking was tremendous in view of the war demands upon manpower and upon transportation arteries. By making use of this evacuated equipment it was possible to erect many refineries and other plants in 1942 and in early 1943, and to start production of gasoline and other war products. Most refineries were thought in full operation by early 1944.

Fortunately, the many oil deposits developed in the east and central portions of the Soviet Union proved to be so extensive that according to recent reports the refineries in the Ural and Central Asia areas are now supplied largely from the new fields developed, and by increased production from older fields.

"Second Baku" Developed

Before the war, the oil industry's machine-manufacturing industry was located almost entirely in the old historic center at Baku, with only partly developed units operating in the east. During 1941 and 1942 a number of machine shops were moved and rebuilt in the central and eastern portions of the country and in addition new plants were constructed and equipped. These are now said to be almost, if not wholly, adequate for development in the huge new regions being opened to extensive development in the Ural-Volga or "Second Baku" area. These plants are producing not only equipment for oil wells and refineries, but in addition are turning out some war goods.

Technological research has been responsible for many developments in the industry, the most urgent and pressing problems of increasing production in advance of actual drilling being solved by men assigned to such problems. Since the beginning of the war more than 50,000 Russians have been trained as geologists, geophysicists, engineers, drilling and operating workers, and equipment specialists. Such a program is bound to yield results. Nearly half of the new workers are women.

Ural-Volga "Second Baku"

The greatest concentration of effort, and the greatest return from such effort, has been in the area lying between the Ural Mountains on the east and the Volga River on the west, in a 2000-mile curved line extending from the Emba fields on the north shore of the Caspian Sea, northward to the Pechora regions in the frozen tundras of the Arctic. The most important deposits have been found in a 500-mile strip in the central portion where the arc broadens out between the Urals and the Volga, and it is this portion which is termed by the Russians as the Second Baku. While this area has had relatively important production since opening of the Ishimbayevo fields in 1932, the German drive into the Caucasus, aimed at Baku, supplied the impetus for immediate development north of the Caspian Sea. As a result the oil combines of Kazakhstan, Kuibyshev, and Molotov, controlling all petroleum enterprises from the north shore of the Caspian almost to the Arctic Circle, have reported increased production from an estimated 75,400 barrels daily in 1941, to approximately 150,000 barrels daily in 1943, and are credited with a daily average during 1944 of 200,000 barrels.

In other words, assuming that the Baku fields produce 160,000,000 barrels in 1944, which is regarded as a safe estimate, it can be seen that the Ural-Volga fields, including the Emba fields on the

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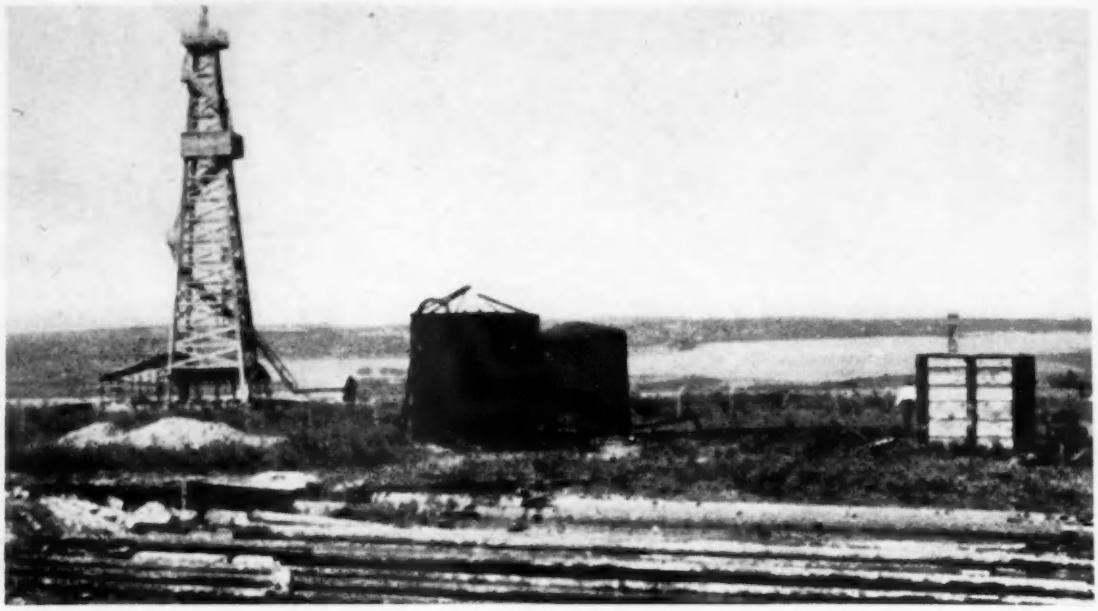


Well in Syzran field, Volga district, U.S.S.R.

south, now account for nearly 27 percent of the output of the nation, compared with 12½ percent in 1941. The Baku fields, without declining in total yield, are producing approximately 59 percent of the total Russian output as compared with 72 percent only 3 years ago.

Since 1932 more than 100 new producing areas have been discovered in the Second Baku and exploration is continuing at as rapid a rate as is possible with limited equipment. Reserves are estimated by the Russians at a figure in excess of 20,000,000,000 barrels or 32 percent of the total held by the Soviet Union. (It must be borne in mind that Russian methods of estimating reserves are considerably more liberal than those in use by American engineers who take into account only that which has been actually proved to be productive by drilling. Even so, Americans have variously estimated reserves in this Russian region at between 7½ and 8½ billion barrels.) Boundaries of this producing area are still being extended, and as far north as the Pechora region production has been obtained. In this region the weather is so cold that the ground never thaws out and special heating equipment is necessary which causes a still greater demand upon manufacturing.

Valuable By-Products

Most crudes produced in the Ural-Volga area have sulphur content of 2 to 3 percent, which retarded progress for a while due to special refinery equipment and techniques needed to minimize corrosion. However, this same factor has resulted in production of large quantities of sulphur as a by-product. Asphalt, high in value in this area, also is obtained. According to reports, the crudes contain from 38 to 41 percent light fractions, including up to 18 percent gasoline with total gasoline yield from the crude running as high as 52 percent. All Ural-Volga crudes are said to be good bases for high-octane gasoline.

Most of the important new producing fields are located within the Kuibyshev Combine area, extending from the Middle Volga eastward into the Urals. Reliable information indicates the area has seen the greatest exploration and development activity since the oil is found at shallow depths, ranging from 300 feet deep to not much more than 1000 feet in a majority of the fields. Hence the discoveries at Syzran, Yablonovoy, Kraznyar, Kinel, Buguraslan, Sterlitamak and Ishimbayevo rapidly are being developed and extended. This progress is at the expense of development of proved reserves in the Emba area of Kazakhstan, farther south. The Emba fields are dominantly salt dome accumulations and while they rival Baku from the standpoint of ultimate reserves, their development involves deep drilling and a high ratio of dry holes. This is a long-term proposition which apparently does not fit in with the wartime objectives of the Russian economy.

Further proof that Russia is concentrating on immediate discovery and development of shallow fields is indicated by the fact that the Soviet government, early in the spring of 1944, ordered from the United States, 300 portable drilling outfits for slim-hole drilling and prospecting to depths of not more than 2500 feet. It is reported that most of this equipment has been delivered and is in service in the Ural-Volga area.

Soluble Compounds Used

Following extensive research, methods of increasing production from old wells have ben worked out and adapted, including acidization, shooting, and others. One development in the Ural-Volga area is that of inserting soluble compounds into wells to increase the flow. A number of plants are being operated in the region, which produce hydrochloric acids and alkaline solutions for well treatment. In addition there have been developed, electrical bottom-hole pumps with capacities up to 700 barrels daily, and gas-lift equipment to make wells flow where formerly they had to be pumped. The latter was developed at the Moscow Oil Institute.

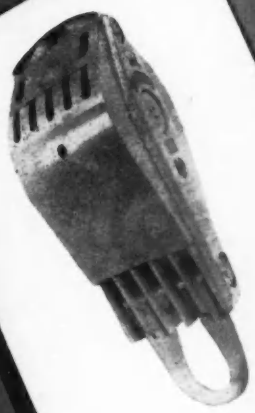
In the region of the Second Baku, new fields discovered since the war began are said to include: Sabor, Krasnoyar, Ammonak, Elshan and Karlinsk. Important production has also been reported on the flank of the Krasnokamsk field in the northern part of the Ural-Volga area.

While exploring in the Buguruslan and Saratov regions, great quantities of gas were said to have been found and this is being used for industrial purposes. Saratov, Kuibyshev, Ufa, Magnitogorsk, and other central Ural and Volga River manufacturing cities are supplied with gas from nearby fields. According to reports, a 400-mile gas pipe line is said to have been completed recently which will supply the steel plants at Sverdlovsk from the new field near Cherdin at the northernmost bend of the Kama River.

Farther south on the Kama River, major oil fields have been developed during the war period at Polazna and Krasnokamsk. It is believed their output is shipped by barge to a rail terminal and refinery at Molotov. Another large oil field, discovered in 1931 near the far-northern city of Uchta, in the Pechora basin, is reliably reported to have been extensively developed within the last two years. A lend-lease refinery is in operation there with rail connection to the Moscow-Leningrad railway, 1100 miles to the west. The output of this field and the refinery is claimed to be as much as 50,000 barrels daily, but this estimate may be much too high.

Important Fields in Emba Area

Besides the oil deposits now being developed in the Kazakhstan and the vast Ural-Emben region at Narmundanak, Galdybay, Kulsary, Sagiz, Iskine, and others; new discoveries have been reported at Altykul, Bek-Beke, and ispulay. The production of oil from the Emba district is increasing, but Russians believe that the possibilities of this rich oil basin cannot be fully realized until further attention can be given to economic development such as roads, water, shops, and dwellings. Potentials of the fields are regarded as enormous, although total productive capacity probably does not exceed 25,000,000 barrels yearly at the present time. A trunk pipe line serves the fields, connecting the Caspian port of Guriev and the rail center or Orsk, more than 500 miles to the



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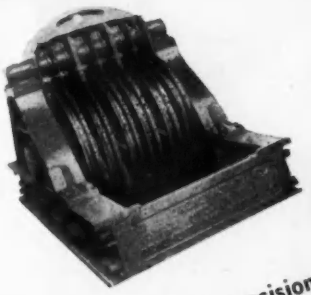

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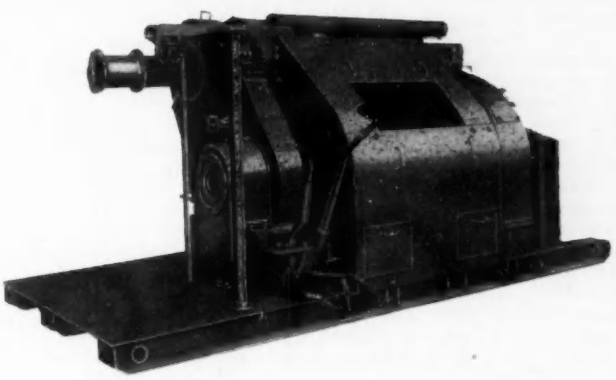

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Transporting a derrick by tractor in the Krasnokamsk oil fields (Sverdlovsk region) U.S.S.R.

Discovery well of the Syzran field, in the Samara Bend of the Volga, opening up the first Pennsylvanian production in Russia. Ishembaevo, 200 miles southeast, produces from the Permian lime, not unlike West Texas.

northeast. Even so, outlet is too limited to encourage further development.

In Turkestan, press reports say, rich new oil and gas fields have been discovered and are under development at Palvontash and Kokayta, while extensions and new sand discoveries have considerably augmented reserves in the fields of Nebit Dag, Chelikov, Samarkand, Andejon (Ferghana) and Bukhara. How much is being produced in this isolated area, or what its ultimate destination is, the Soviet government does not reveal.

In eastern Siberia, the Russians are reliably reported to have increased production of the fields on Sakhalin Island during 1944, and to have begun development of several fields recently discovered on the Kamchatka Peninsula. Sakhalin production alone is estimated at 15,000 barrels a day, nearly half of which is being refined at Khabarovsk, near the Manchukuo border, where a cracking unit is said to have been added to the prewar refinery. Power barges carry the oil from Sakhalin Island up the Amur River to the refinery.

During the fall of 1944, discovery of a new oil field was reported at Kashkara, only a few miles west of Astrakhan in the Volga delta region. This is the first field along the northwest shore of the Caspian Sea, about midway between the Grozny and the Emba fields. At latest report 5 producers had been completed at a depth of approximately 750 feet, and a camp, storage facilities, and a 10-mile pipe line to Astrakhan already have been constructed. Plans are said to call for 40 more wells on proved acreage.

Initial development of several new fields between the Araxes and Kur rivers of the Caucasus region was reported by Russian authorities late in October. Other sources have confirmed the fact that widespread drilling activities are underway in the area, some of them within sight of the Persian border. This development may explain why the Soviet Union wanted exploitation rights in north Persia.

Reports from Moscow claim that three major fields, yielding oil of exceptionally high quality, have been opened since last July near Kirovobad, and in the Khilin and Talyanov districts. Wildcatting is in progress in the Naftaman area, aimed at proving up another pay area around an isolated producing well completed in August.

Geological studies by Russian scientists emphasize the potential importance of the southern Khilin region along the Araxes River, where pay zones are believed to lie within 1000 feet of the surface and where a number of closed structures have been mapped. This potential producing area extends southward into Persian territory and eastward to the shore of the Caspian Sea.

Bottlenecks

Reports indicate that, however great have been the achievements of the Soviet Union during the wartime emergency, there still is much to do before bottlenecks are all eliminated. Up to now, losses of oil products during storage and in pumping have been considerable. There is a lack of replacement and spare parts, for production equipment, and tools for repair work. A number of refineries have not yet reached their assigned quotas. At some points, the supply of crude to the refineries is insufficient because of these bottlenecks.

Shortage of metals and other critical materials is reportedly responsible for a number of experiments being conducted by the Russians in drilling operations. In some areas the new turbine method of drilling has been widely used, and reports indicate that some of the shallow areas have gone exclusively to this type of drilling. Results of these experiments seem to be so gratifying that this particular area regards the turbine method as having been proved superior to rotary in drilling time and cost.

Electric Rigs Popular

One of the problems pressing for solution during the period of expansion has been motive power. Wherever possible the Soviets are using electric energy, and have indicated great progress in simplification of plans for construction, use of non-essential materials wherever possible, and evacuation and relocation of generating plants. Local resources are utilized to the fullest extent, and mobile electric diesel stations are becoming popular. Authoritative sources state that electrical generating capacity in the eastern regions has been increased by 21,000 kilowatts during the past 2 years, and that the combined power capacity of new engine-driven units installed in 1943 and 1944 amounts to 72,650 kilowatts. Here, as in other branches of their industry, the Russians are plagued with the same deficiencies brought on by wartime conditions—lack of materials, lack of skilled labor for repairs and upkeep, uneconomical use of fuel, and other factors.

Bolivia Proceeding with Program to Make Nation Self-Sufficient in Oil

Oil industry there is nationalized and with help of funds from United States development continues, but considerable progress is required because production and refinery output both are falling far short of domestic needs which have been intensified by war mining activities.

OPERATING its nationalized oil industry through the government company, Yacimientos Petroliferos Fiscales Bolivianos, with aid of funds furnished by the United States government, Bolivia is proceeding with a program aimed at making the country self-sufficient in petroleum. But a great deal of development will have to be carried out before the goal can be reached, involving considerable drilling and also pipe line and refinery construction. At present both crude production and refinery output fall far short of consumption needs, which have been increased sharply through intensification of the mining of tin, tungsten, antimony, and other metals, for military use of the United Nations.

The furnishing of funds for oil development by the United States is part of a broader program of economic assistance to Bolivia, involving development of the country's mineral resources, oil being especially essential as fuel for mining operations. The general program was initiated in 1942, and oil development under the program was started after nationalization of the industry was finally settled in April of that year. At that time Bolivia paid $1,729,000, through the state department of the United States, to Standard Oil Company of Bolivia (Standard of New Jersey), for amicable surrender of all claims to the industry, which the company had established by finding and developing the known fields and carrying out extensive pre-development exploration.

Topping Plant Projected

Bolivia consumed petroleum products at the rate of 1800 barrels daily in 1941, but currently has potential demand materially above that rate. Available refining facilities, consisting of 2 topping plants each turning out about 500 barrels of products per day, are supplying only around one third of the present potential domestic requirements, although the plants are held down from their combined capacity of about 1400 barrels per day mainly by lack of transportation. So that urgent demand can be met, plans call for construction of a 2000 barrels per day topping plant in the mining district, along with expansion of production in Bolivian fields. Currently, Bolivian crude production is averaging 1300 barrels daily, but that output includes 300 barrels a day from a field whose output is committed for export to Argentina, leaving only 1000 barrels a day of the present Bolivian production which is going into domestic use.

TABLE 1
Wells Drilling in Bolivian Fields
September 1, 1944
(No wildcats being drilled in country at that time)

Well Number and Method of *Drilling	DEPTH	
	Meters	Feet
Bermejo:		
B. 10 (R)	1,278	†4,192
B. 11 (R)	934	3,063
B. 12 (R)	746	2,316
Sanandita:		
17. (CT)	381	1,251
21. (CT)	178	584
Camiri:		
7. (CT)	1,182	3,877
9. (CT)	605	1,984
Total, 7 Wells	....	....

* (R): Rotary; (CT): Cable Tools.
† Designed as a deep test and now plugged back to production.

In building up crude producing ability, effort is being directed at present to the development of the several established fields of the country, no wildcatting being under way. The current drilling consists of 7 wells, of which 2 are being drilled with cable tool equipment in the Sanandita field, 2 with cable tools in Camiri field, and 3 with rotary rigs in the Bermejo field, the latter being the area that furnishes oil to Argentina. Information on the drilling wells appears in Table 1.

Plans for the near future likewise will concentrate on further developing established fields. The only wildcatting that is contemplated is the drilling of two tests in the area near Santa Cruz, on the Middle Devonian. During 1945-1946, at least 57 wells will be drilled in Bolivia, under present plans, as shown in Table 2.

Six Potential Fields

In Bolivia there are 6 potential producing fields, located in the south central part of the country, adjacent to and north of the middle of the southern (Bolivia-Argentina) border, one of the fields (Bermejo) lying across the border from the Aguas Blancas and Rio Pescado producing areas of northern Argentina. The Bolivian fields lie in a chain along the eastern side of the Andes Mountains, being related geologically to other sub-Andian fields that extend from Colombia through Ecuador, Peru, and Bolivia to southern Argentina. The 6 potential producing fields of Bolivia include the following, from north to south: Saipuru, Camiri, Buena Vista, Camatindi, Sanandita, and Bermejo. Only 3 of these, namely, Camiri, Sanandita, and Bermejo, are now in operation. However, Saipuru is scheduled for participation in the 1945-1946 drilling program. Camatindi remains inactive, with 3 wells shut in, but it represents a reserve of perhaps 2000 acres and eventually will be developed as a reserve to supplement production at Sanandita. Buena Vista has had no commercial development and is not on the present program of development, but Standard of Bolivia found it potentially productive by drilling a well that yielded oil.

TABLE 2
Minimum Number of Wells Scheduled to Be Drilled in Bolivia in 1945-1946

FIELD	Number of Wells
Saipuru	10
Camiri	29
Sanandita	12
Bermejo	4
Wildcats	2
Total	57

In addition to the mentioned known potential fields, there are more than half a dozen promising prospects in Bolivia so far unproductive but having had little or no drilling. Prominent among them is the Tatarenda prospect, department of Santa Cruz, 70 kilometers northwest of Charagua and north of the Saipuru and Camiri fields. One or both of the 2 wildcats scheduled to be drilled presumably will be located in that area, although this has not been verified. On a large anticline in the district, marked by oil seeps, a well drilled in 1928 to 3220 feet encountered 6 gas sands, although the hole was abandoned.

The Bolivian fields produce from formations that range in age from lower Tertiary to Devonian, at depths of 500 to 4800 feet, on structures varying in potential productive area up to 5000 acres. The fields were found through surface evidence of structure or petroleum, including oil and gas seeps and sulphur water.

Santa Cruz Fields

Saipuru field, where 10 wells are scheduled to be drilled in the 1945-1946 program, for the first commercial exploitation of the structure, is in the department of Santa Cruz, 25 kilometers northwest of Charagua and 45 kilometers northeast of Lagunillas, being 60 kilometers (37 miles) northeast of Camiri, the most northerly of the present producing fields. Saipuru was dis-

covered in 1924 when a well temporarily produced 42 gravity oil at the rate of 65 barrels daily from Tertiary sand at 500 feet and also found several other shows of oil and gas in deepening to 2240 feet, where drilling trouble necessitated abandonment of the well.

Camiri field, on the River Parapeti, department of Santa Cruz, 50 kilometers (31 miles) southeast of Lagunillas and the same distance northwest of Cuevo, is the most northerly and largest of the three present producing fields. It was producing 521 barrels daily of 53-56 gravity oil from 4 flowing wells and 1 pumping well in September, 1944, and 2 new wells were being drilled, while 29 wells are scheduled to be drilled during 1945-1946. Two of the present flowing wells have accounted for more than a million barrels of cumulated production, as shown in Table 3. The field was discovered in 1927 and was provided a market in the early 1930's by construction of a topping plant. It has more than 5000 acres that may produce, although only a part of that area is developed. Production is from several horizons in the Devonian, with the main pay at 3200-3300 feet. Petroleum products turned out by the topping plant at Camiri are distributed in the adjacent region by truck and rail. Capacity of the plant is rated at 100,000 liters (629 barrels) daily. However, it has not yet operated at full capacity, due to inadequacy of transportation. Figures on current production of the field indicate that the plant is processing at present about 500 barrels daily, although its production of products in 1943 averaged only about 300 barrels daily. Camiri field's high gravity crude, refined in the topping plant, affords high yield of gasoline and kerosene, as shown in an accompanying table. The field will have an important role, therefore, in supplying requirements of the lighter products.

Buena Vista Prospects

Buena Vista, prospective but undeveloped field 70 kilometers (43 miles) southeast of Camiri field, is in the department of Chuquisaca, 30 kilometers (19 miles) southeast of Cuevo. In that area, upon a pronounced fold marked by oil seeps, a well was completed in 1926 at 3165 feet as a potential producer of 250 to 500 barrels daily of 45 gravity oil. However, no subsequent development was carried out.

Camatindi, shut-in field 40 kilometers (25 miles) southwest of Buena Vista and the same distance northwest of Villa Montes, departments of Chuquisaca and Tarija, was discovered in 1929 and has pay sands at 2350, 4100, and 4800 feet, yielding 44-46 gravity oil. Ultimate productive area is estimated at a minimum of 1500 to 2000 acres.

TABLE 3

Current and Cumulated Production, by Wells, in Presently Operated Fields of Bolivia

Well Number and Method of * Production	Daily Average Production September, 1944		Cumulated Production to July 1, 1944	
	Cu. M.	Bbls.	Cu. M.	Bbls.
†Bermejo:				
B. 2 (F)	22.7	143	15,530	97,684
B. 5 (F)	24.2	152	20,656	129,926
B. 7 (F)	1.1	7	3,038	19,109
Total, 3 Wells	48.0	302	39,224	246,719
Av. per Well	16.0	101	13,075	82,239
Sanandita:				
1 (P)	7.6	48	60,668	381,602
2 (P)	9.5	60	37,504	235,900
3 (P)	15.0	94	533	3,352
6 (P)	2.7	17	17,933	112,798
8 (P)	5.8	36	47,011	295,699
9 (P)	4.5	28	7,463	46,942
10 (P)	1.1	7	2,753	17,316
11 (F)	7.1	45	5,532	34,796
12 (P)	3.0	19	683	4,296
13 (F)	5.4	34	3,325	20,914
14 (P)	5.5	35	1,310	8,240
15 (F)	8.7	55	680	4,277
Total, 12 Wells	75.9	478	185,395	1,166,132
Av. per Well	6.3	40	15,450	97,178
Camiri:				
1 (F)	22.9	144	63,993	402,516
3 (F)	24.9	157	105,981	666,620
5 (F)	6.7	42	2,664	16,756
17 (F)	20.3	128	358	2,252
8 ((P)	7.9	50	2,756	17,335
Total, 5 Wells	82.7	521	175,752	1,105,479
Av. per Well	16.5	104	35,150	221,096
Total, Above Fields (20 Wells)	206.6	1,301	400,371	2,518,330
Av. per Well	10.3	65	20,018	125,916

* (F): Flowing; (P): Pumping.
† Depths of Bermejo wells—B. 2: 635.5 meters (2084 ft.); B. 5: 1,096.4 meters (3596 ft.); B. 7: 1,120.1 metrs (3674 ft.)
‡ During perforation.

Sanandita field, department of Tarija, 80 kilometers (50 miles) southwest of Camatindi field, 180 kilometers (112 miles) south of Camiri field, and 45 kilometers (28 miles) northeast of the border town of Yacuiba, was producing 478 barrels per day from 3 flowing and 9 pumping wells in September, 1944, and 2 new wells were being drilled, with 12 more scheduled for 1945-1946. The production was 41-46 gravity oil, from sand at 2000-2100 feet, probably Triassic, with 2000 acres or more considered potentially productive. The dozen wells at Sanandita have produced more than a million barrels. Sanandita was discovered in 1926 and thereafter was provided with a topping plant, for supplying the adjacent district by truck and rail. Sanandita crude is heavier than that produced at Camiri, being around 41 gravity, and it is desirable therefore for production of fuel oil and diesel oil, urgently needed in the mining operations. Capacity of the topping plant at Sanandita is rated at 130,000 liters (818 barrels) daily, although like the Camiri plant it has not operated at capacity due to lack of adequate transportation outlet, as evidenced by the field's current daily production of less than 500 barrels. In 1943 the plant turned out on the average only about 300 barrels of products per day. Because of the suitability of Sanandita crude for making fuel oil and diesel oil, the field will be developed, under present plans, adequately for supplying not only the local topping plant but also the proposed new 2000-barrel per day topping plant at Oruro, in the mining district on the lofty Bolivian plateau. From Sanandita it is proposed to move crude through a 3-inch, 50 kilometer (31 miles) pile line southward to Positos, near Yacuiba, on the Argentine railroad, and thence by rail to Oruro.

Table 4 deals with refining and consumption shows yields of the different products from topping plant operations at Sanandita as well as Camiri in 1943. It also shows how the production of the two plants in 1941 supplied only a third of Bolivia's domestic requirements in that year, making necessary importation of the remainder, which came mainly from neighboring Peru, a petroleum exporting country.

Three Bermejo Producers

Bermejo field, on the Bolivian-Argentine border and extending on both sides of the Bermejo river, which forms the border, is 140 kilometers (87 miles) southwest of Sanandita field, 45 kilometers (28 miles) northwest of Oran and 65 kilometers (40 miles) northwest of Embaracacion, Argentina. The field in September of this year comprised 3 wells flowing about 300 barrels daily of 26 gravity oil, and 3 new wells were being drilled, while 4 additional wells were scheduled to be drilled during 1945-1946. The oil produced at Bermejo comes from three separate zones in the Triassic at 2100-2200 feet, around 2850-2900 feet, and at 3600 feet, and productive area is expected to embrace more than 1500 acres. From discovery in 1927 up to July 1, 1944, Bermejo has produced 246,719 barrels from 3 wells, although the field was shut in for 12 years after early development and not put back on production until 1942. Bermejo has no local refining facilities, and its output is refined and consumed in Argentina, the crude yielding by straight distillation a little more than 30 percent of lighter products and about 68 percent fuel oil. The field's development will be carried on in accordance with the Bolivian-Argentine treaty of February, 1942, under which the Bolivian-government oil company will sell to the Argentine-government oil company a minimum of 1000 barrels per day of Bermejo crude, above which amount Bermejo crude may be consumed by Bolivia in volume up to 50 percent of Bolivia's domestic demand. The two government companies have contracted with Standard Oil Company of Argentina for movement of the oil southward through Standard's pipe line from Aguas Blancas field, across the river from Bermejo, to the refining-railway center at Manual Elordi, near Embarcacion, Argentina. From Manuel Elordi the Argentine government company will move Bermejo crude by rail to Argentine refineries for Argentine consumption.

TABLE 4

Production of Petroleum Products by Bolivian Refineries and Relation to Domestic Demand

PRODUCT	PRODUCTION OF REFINED PRODUCTS IN 1943					CONSUMPTION, DOMESTIC PRODUCTION AND IMPORTS TOTAL BOLIVIA, IN 1941—Barrels			
	Camiri Refinery		Sanandita Refinery		Total Bolivia in 1943 (Barrels)	Domestic Demand	Domestic Production		Imports
	Liters	Barrels	Liters	Barrels			Barrels	Percent of Demand	
Gasoline	10,473,501	65,878	6,300,979	39,633	105,511	187,009	114,338	61	72,671
Kerosine	2,363,696	14,868	827,517	5,205	20,073	20,233	11,815	58	8,418
Fuel Oil	3,199,561	20,125	9,102,999	57,258	77,383	312,894	97,284	31	215,610
Diesel Oil	1,002,533	6,306	1,000,922	6,296	12,602	137,529	10,193	7	127,336
Total	17,039,291	107,177	17,232,417	108,392	215,569	657,665	233,630	35	424,035
Daily Average	46,683	294	47,212	297	591	1,802	640	35	1,162

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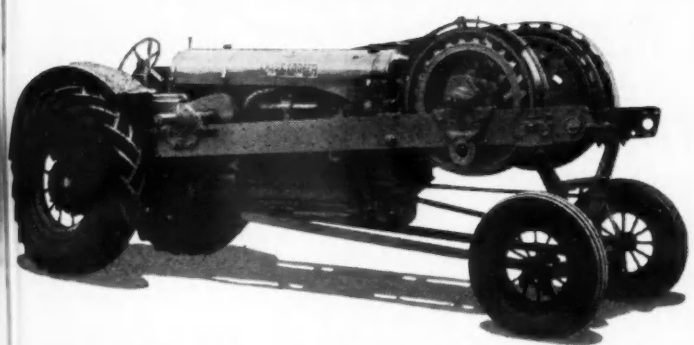

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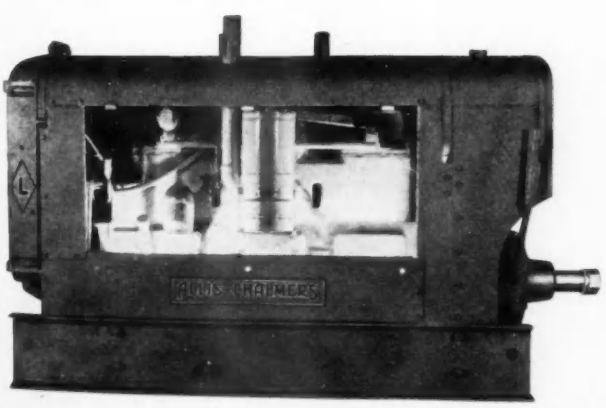

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Scene in Western Venezuela showing tank forms and oil wells surrounding the village of Cabimas. This and other photos in this article through courtesy of Standard Oil Company (New Jersey) by Vachon.

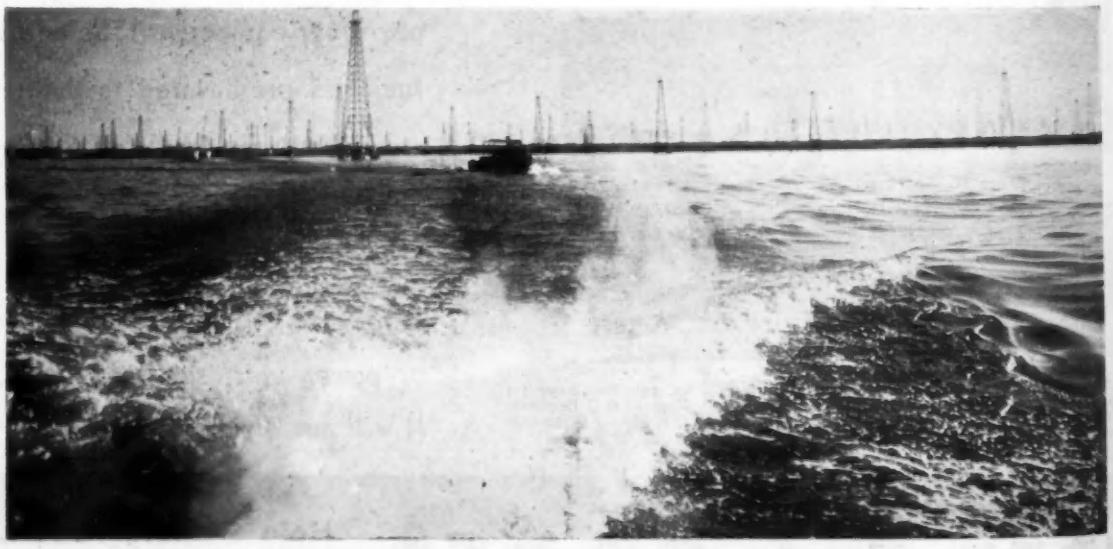
Venezuela Production at Peak But Still Short of Objective

Failure to reach million-barrel-per-day goal is due to delays in getting equipment and insufficient pipe lines

VENEZUELA will produce a total of approximately 267,000,000 barrels of oil during 1944. This will represent an increase of 87 million barrels over the output of 1943, and nearly 50 million barrels more than the previous record year of 1941.

The country's output is increasing steadily, so an even greater production is indicated for 1945. Venezuelan production averaged 492,000 barrels for 1943, as compared with 574,000 barrels in the first quarter of 1944, and increased to 732,000 barrels for the second quarter, then climbed to approximately 790,000 barrels per day during the third quarter. Production during the last quarter of 1944 is expected to reach an average of approximately 830,000 barrels daily. At this level, Venezuela will be producing approximately the same quantity as the state of California.

In view of the difficulties of this accomplishment, it is a distinct tribute to the enterprise of all concerned, even though it falls considerably short of the million-barrel-per-day objective on which PAW a year ago set its sights for the year end. Undoubtedly, the goal would have been accomplished, if the necessary equipment, supplies, shipping space, trucks, tankers and pipe lines could have been made available for use according to plan. The needs of the armed forces for equipment made of strategic materials, however, upset the PAW schedule, leaving no legitimate cause for complaint. Although there has been some criticism of the time-consuming administrative routines followed by the many government agencies having direct or indirect authority to rule on programs, priorities, allocations and deliveries, on the whole oil company officials agree these matters have been



Tia Juana field, Lake Maracaibo, Western Venezuela, showing forest of derricks in the productive lake.

Left: Oil workers camp, an up-to-date project familiar to North Americans, located at Lagunillas in Western Venezuela. Photo was made in February, 1944.

properly and fairly handled in a spirit of utmost cooperation.

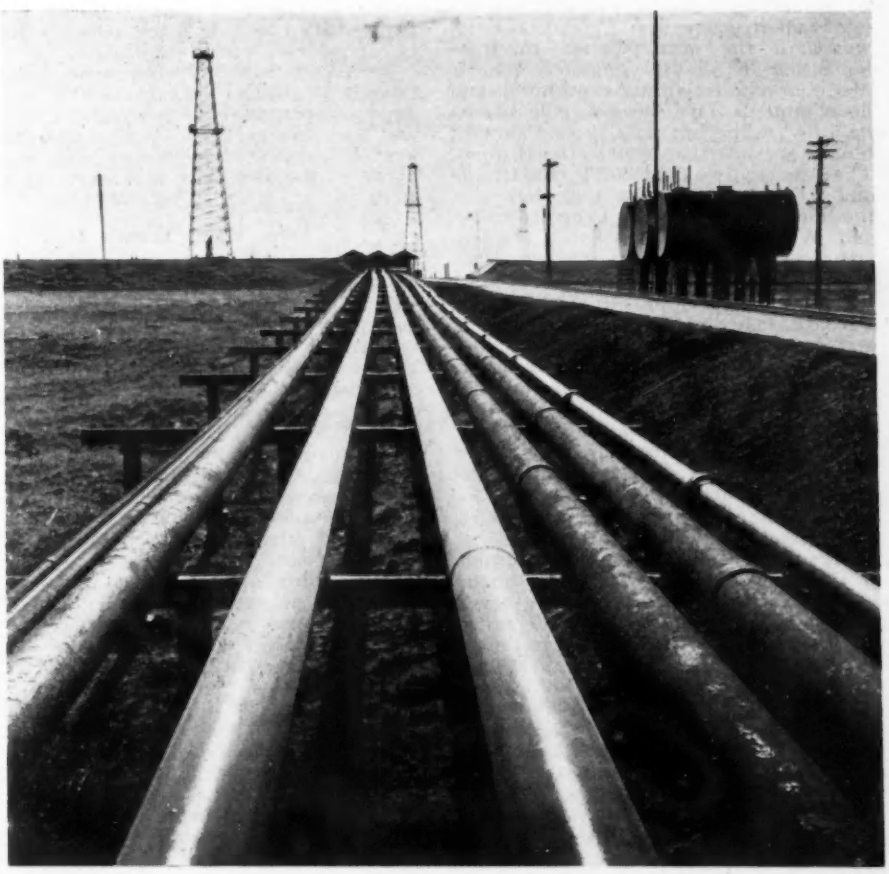
At the present more than two thirds of the output is derived from fields in the Lake Maracaibo region—more than 550,000 barrels daily at the beginning of November. This yield is probably close to the optimum for the region, being essentially the balance point between decline and development potentials. This production rate may be cut back by as much as 35 percent as abnormal war time demands decrease.

Fields in Eastern Venezuela were being produced at the rate of approximately 250,000 barrels per day at the beginning of November, a rate nearly equal to the combined capacities of existing pipeline outlets, although considerably less than total field potentials. Of the total current yield from eastern Venezuela fields, about 52 percent is being produced from Creole and Creole-Pantepec wells, 36 percent from wells operated by Mene Grande Oil Company (Gulf), and 12 percent from Consolidada Company (Sinclair) wells in the Santa Barbara field.

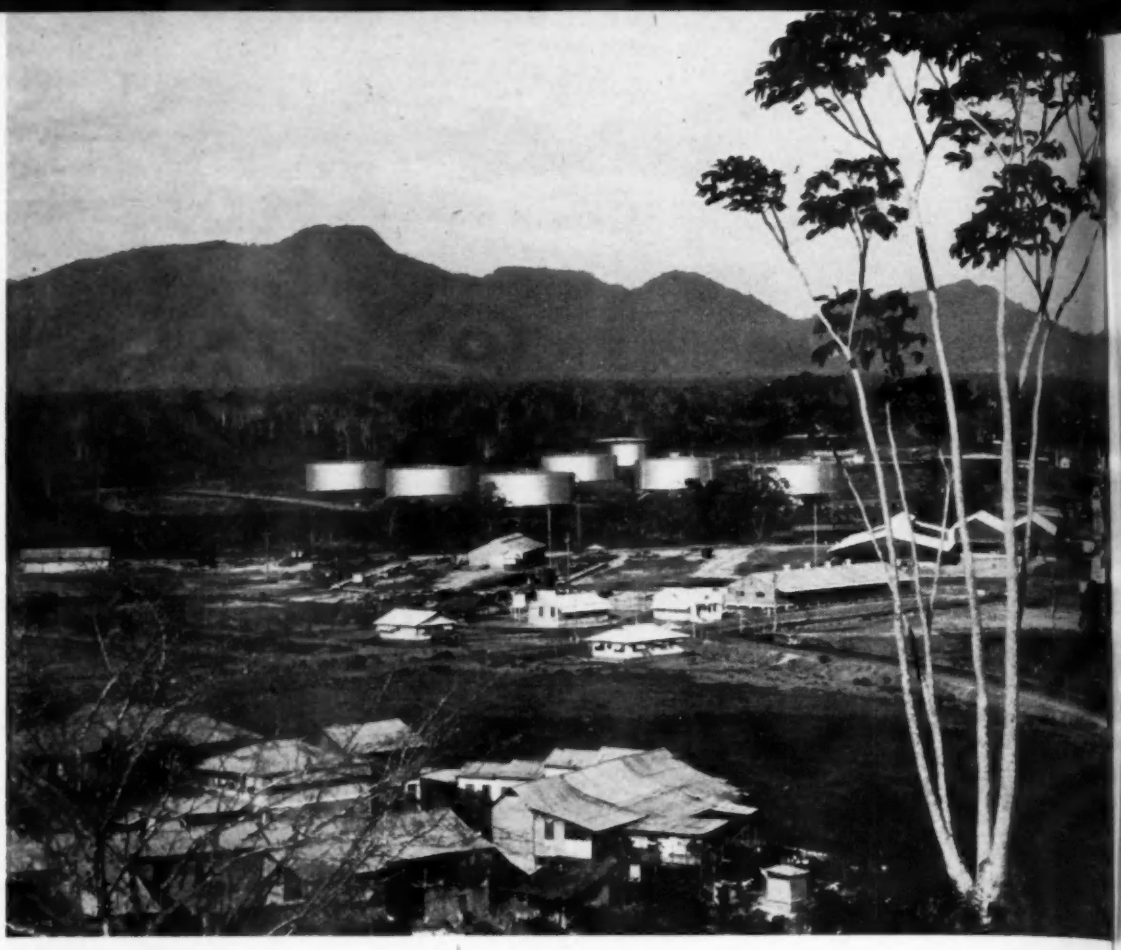
Adding Pipeline Facilities

The new 16-inch pipeline from Puerto La Cruz to the Jusepin-Mulata fields, under construction by Creole and Mene Grande interests, will have a rated capacity of more than 95,000 barrels daily. This does not mean that the completion of the line in December or January will result in an immediate boost in production of that much more oil from Creole, Pantepec and Gulf properties in the Maturin region. Probably half of this capacity will be utilized only as fields are extended in future months, or as new fields are opened to the west along the route to the coast.

The Mene Grande company has al-



Pipe lines leading to Lagunillas dock in Lagunillas which is located in Western Venezuela.



Workers' camp at Lagunillas in Western Venezuela.

ready proved up considerable acreage west of the Santa Barbara field, and has 14 producing wells on property adjoining Sinclair production. From that point westward the new pipeline traverses lands that are almost completely held by Mene Grande for future exploration and development. Two large Creole blocks lie athwart the line, and three Pantepec blocks are less than 3 miles north of it. The latter will be operated by the Creole and Atlantic companies. Completion of the line will therefore be expected to result in the testing of other promising areas west of the Santa Barbara-Multata- Muri-Jusepin producing district.

Continued development of the Santa Barbara field by Sinclair interests is certain to take place during 1945, and the present Sinclair pipeline will be unable to handle the field output potential unless additional pumps are installed. It is understood that more pumps will be put in, to increase the line capacity to 50,000 barrels per day. It is now handling 30,000 barrels.

The present Gulf-Creole pipeline to the Greater Oficina field area has a capacity of 115,000 barrels daily. Output of these fields now amounts to about 80,000 barrels daily. The line also serves five partly developed fields 40 miles north of Oficina, from which it draws approximately 10,000 barrels per day, more than half from the El Roble field (Creole-Pantepec). El Roble is to be further developed in 1945. It has 10 widely-spaced wells. In the same general vicinity the San Joaquin and Santa Ana fields are already in process of being developed, with interest centering on the effort of S. A. P. las Mercedes (The Texas Company) to prove up the Rincon area adjoining the Santa Ana field on the south. Mer Grande has 3 producing wells in the Santa Ana field, while 2 producers have been completed in the Rincon area. Rincon Largo 3 is being drilled as a deep test between the two producing areas.

In the Greater Oficina area Mene Grande is drilling and extending producing acreages, especially in the east and west Guara fields. Creole and Socony-Vacuum Oil Company are also active in the area, but have only a few wells.

Two Main Trends

Further exploration and development of the petroleum resources of Eastern Venezuela is most likely to be concentrated along the two main trend lines marked by present producing fields in Monagas and Anzoategui, but which extend westward through Guarico. The region farther south is not only less accessible but discoveries there to date have proved only the existence of very heavy oil. Opening of a new area is such an expensive proposition that every advantage must be taken of utilizing roads and pipe lines that already traverse areas not yet developed.

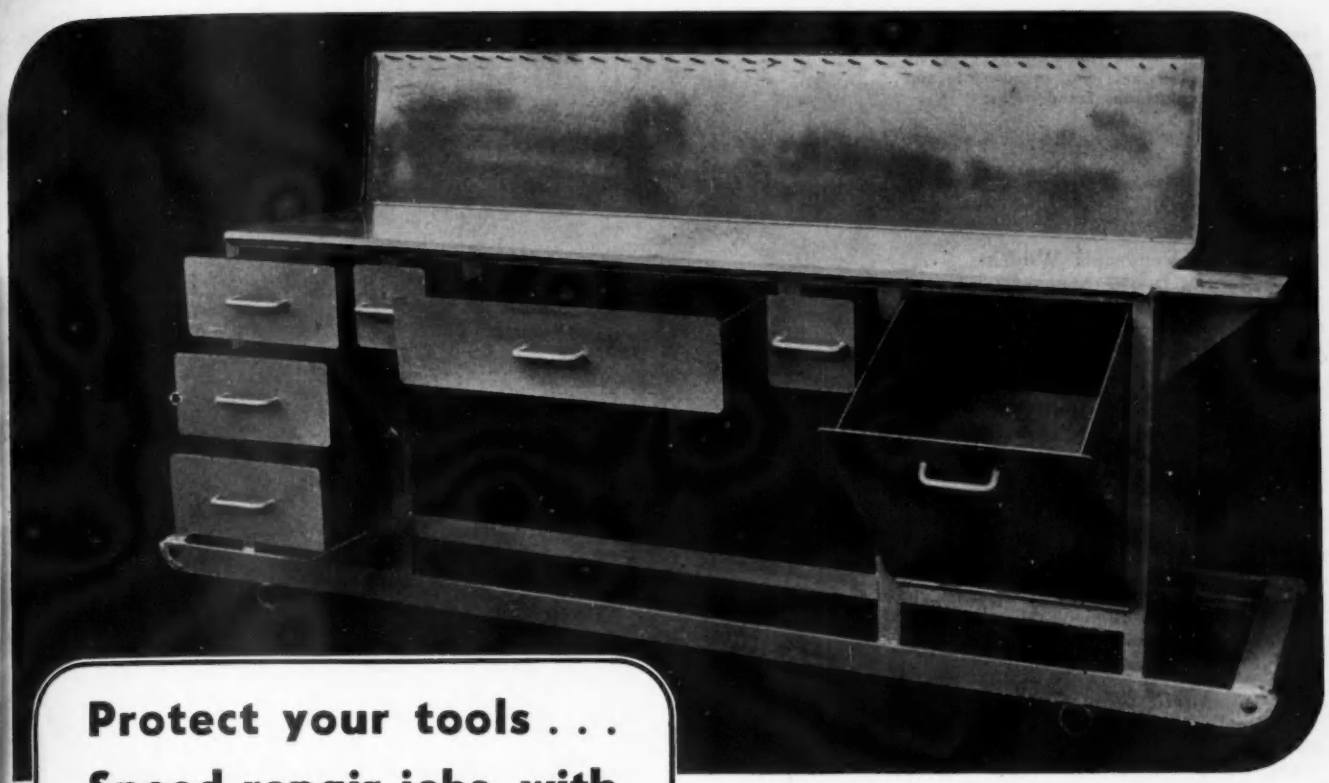
This means, of course, that the bulk of the best prospecting territory in Monagas and Anzoategui is not available to a number of companies that would like to get in on the play. Gulf and Standard interests hold concession contracts covering almost all the desired blocks. Shell, Texas and Sinclair subsidiaries holdings are relatively sm.ll, as are those of Socony-Vacuum. The Atlantic Refining Company has obtained a joint interest in the Pantepec concessions not already assigned to Creole for operation.

The "have not" companies with eastern Venezuelan ambitions are thus forced to try their luck in the mountainous coastal strip or in the swampy Orinoco delta region. The only other alternative is to move westward and open up new territory in Guarico.

Texas Petroleum Company and its S. A. P. las Mercedes have done both. The Texas field at Caritos has one producing well (low gravity) and 4 dry holes. In addition, this company recently drilled a deep wildcat 40 miles east in Delta Amacuro, completed early in November as a dry hole. It has proved production in its Rincon block, but this is surrounded by Mene Grande and Socony blocks. East of Mene Grande's Leona field S. A. P. las Mercedes has a nearly solid block of parcels aggregating 125 square miles directly in line with the Oficina-Leona trend, and which may ultimately prove to be very valuable property. This subsidiary of The Texas Company has gradually been acquiring exploration and exploitation rights on huge areas in Guarico and Aragua, and is now developing the Mercedes field in the northern part of the Infante District, Guarico.

Mercedes Field Isolated

The Mercedes field, in November, had 6 producing wells, all shut in. Because of its isolation, the field is unlikely to acquire an outlet for some time, unless its producing potential can be shown to be large enough in coming months to justify the laying of a pipeline into the area or unless the company finds other producing fields in the vicinity. The field is 130 miles from nearest production to the east, and 100 miles south of Caracas. Equipment and supplies for operations in the area are hauled from the coast by truck, over a circuitous highway route that more than doubles



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	TYPE "A"	TYPE "B"
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Drawer Dimensions:	Width	Length	Depth	Width	Length	Depth
Three on right	16"	24"	6"			
Large center drawer	30"	24"	6"			
Two, each side of center drawer	6"	24"	6"			
Rag bin	20"	24"	24"	16"	12"	19"
Two lower right drawers				16"	22"	8"
Two top drawers				26"	22"	8"

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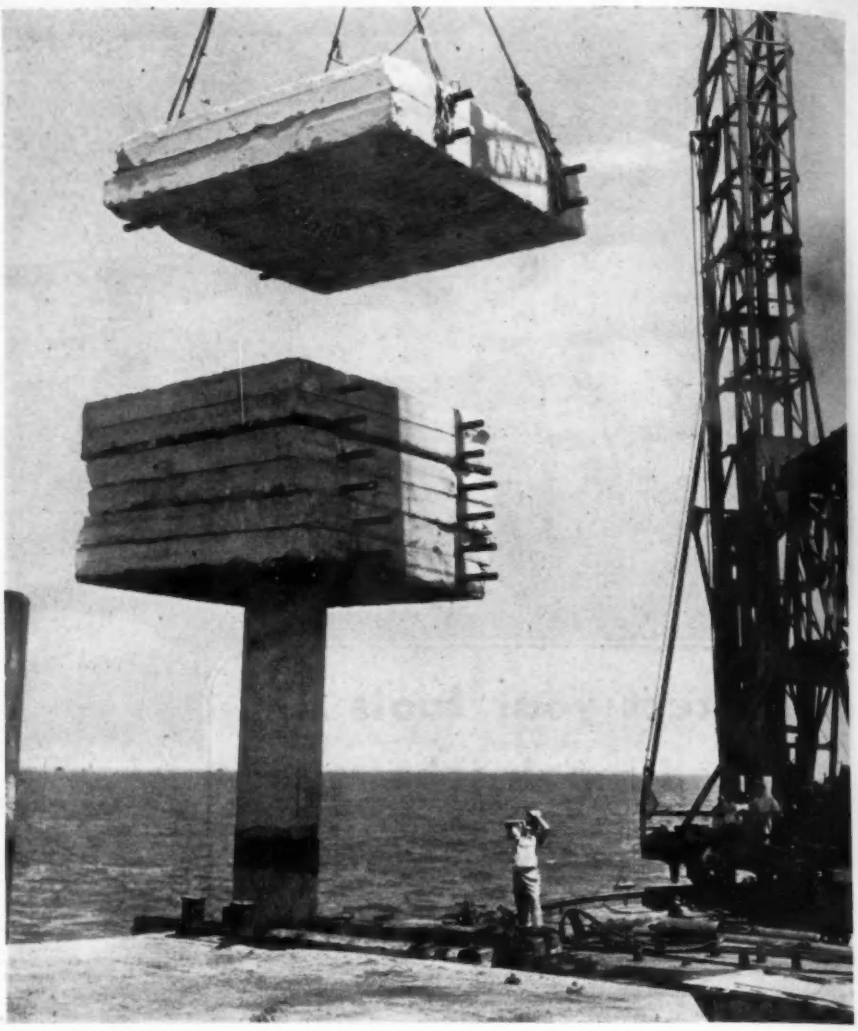
Right: Weights are placed on caissons in order to sink them in Lake Maracaibo, Venezuela. The caissons, 150 feet long, are used to support platforms for derricks.



the actual distance. The company is starting a wildcat, Manapire 2, 35 miles farther inland and southeast of the Mercedes field.

Other Venezuela Wildcats

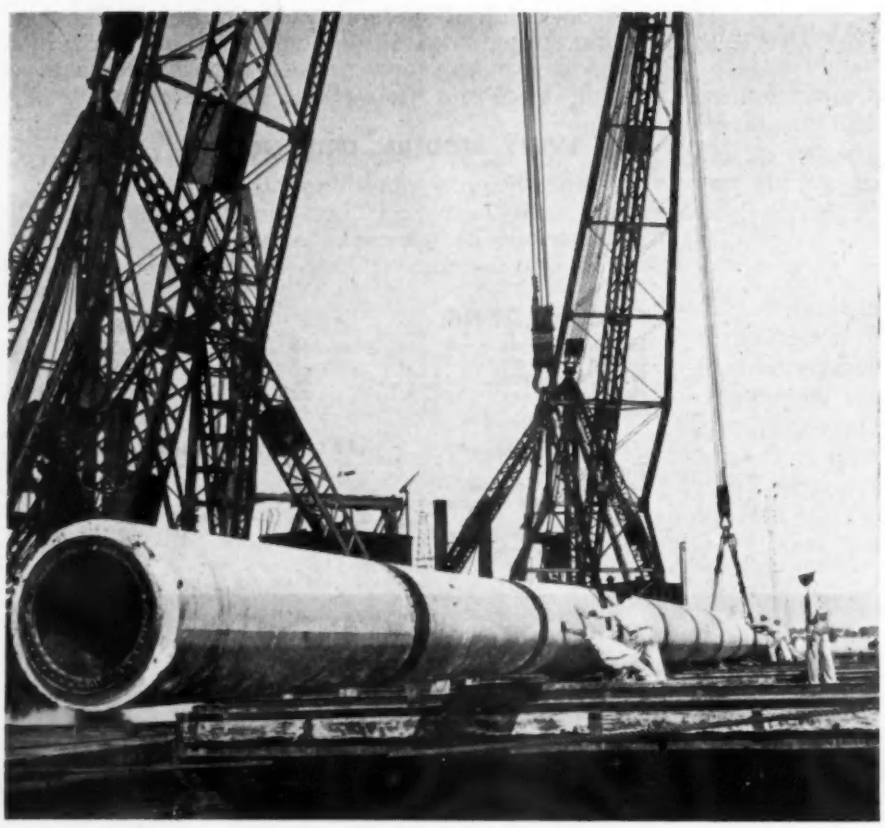
In addition to the Manapire wildcat, Texas' Rincon Largo 3 is regarded as an important deep test between producing areas in the Santa Ana district. The Dutch Shell group is drilling a test well more than 2 miles east of the Lagunillas field, in the Lake Maracaibo region. Richmond Petroleum Company (Standard Oil Company of California) is preparing to spud its first well in Venezuela — a wildcat on its Montanita block, District of Miranda, State of Falcon. Recent wildcat failures include the Texas 9244-foot test in Delta Amacuro, and Mene Grande's Panda wildcat, drilled to 6900 feet and abandoned in October. The Pando well was drilled 5 miles southeast of the producing limits of Oficina proper.

Apure Basin Play

In Western Zenezuela competition is keen in bidding for concessions in the Apure Basin region, covering most of Apure and Zamora south of the mountains. Several companies have been carrying on detailed geological and geophysical surveys in the area during the past year, and bids have been accepted and approved on large blocks. Most successful bidders to date are Socony-Vacuum and Sinclair. Amerada has a block of 100,000 acres in the western part of the basin, obtained several years ago.

Testing of the Apure area will get under way as soon as restrictions are lifted on the manufacture and sale of required equipment and supplies. It is generally conceded that the possibilities of the area are beyond dispute, and that wildcatting and development activities there will be on a grand scale as soon as conditions permit.

Below: Salina industrial yard in Western Venezuela showing how 150-foot caissons, used for derrick foundations in Lake Maracaibo, are loaded on barges for transportation to well location.



Russia Getting Half of Prewar Poland Production

Poland's four leading oil fields in the San Basin, west of Lwow, have been redrilled and otherwise restored to production, following occupation of the area by the Red armies. Combined output from the fields at Krosno, Rzeszov, Sanok and Nisko during September amounted to 116,000 barrels, or an average of 3866 barrels per day. These four fields accounted for two thirds of Poland's prewar output, and their current rate of yield is about 40 percent short of prewar normal. Restoration is expected to be nearly complete by the end of next January.

It is reported that more than 20 small refineries are again in operation in Poland, and 2 natural gasoline extraction plants are in operation. Nearly all of the products are being used by the Russians for military purposes.

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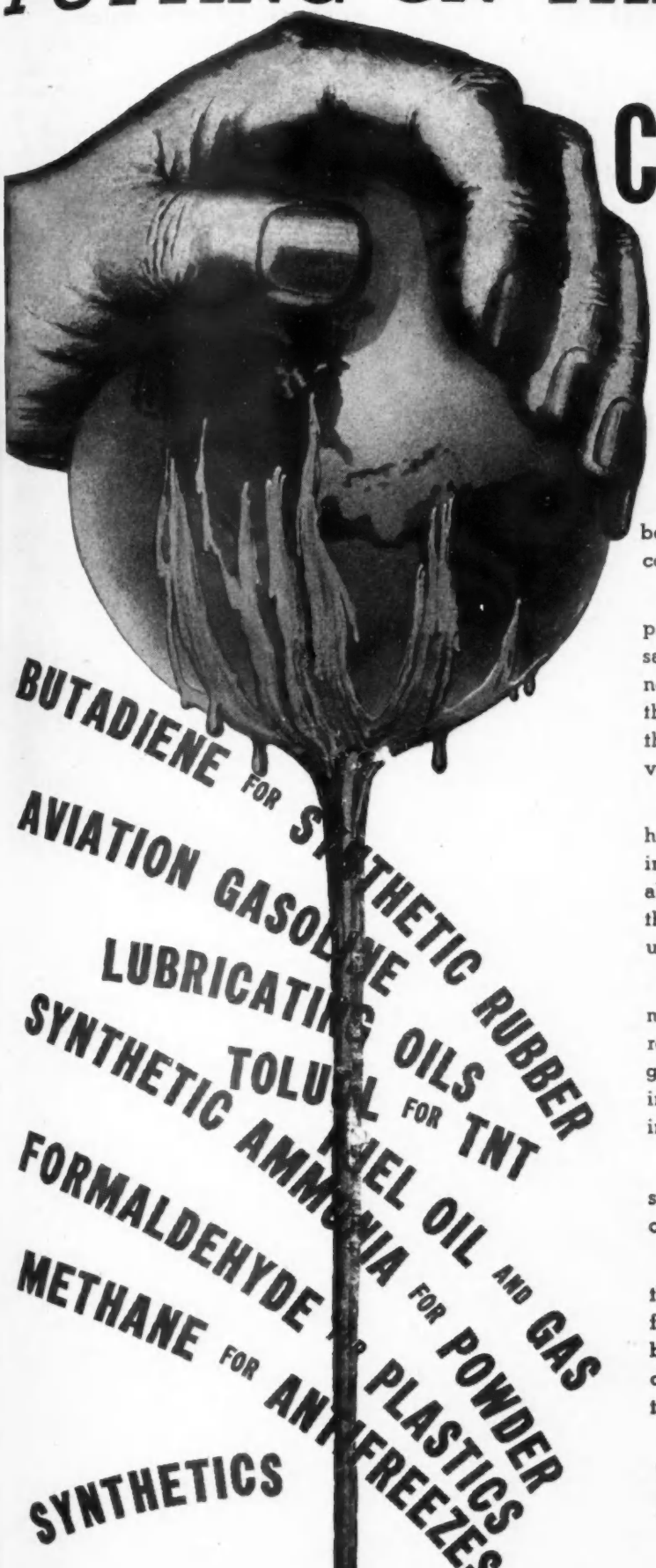

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Thirty million barrels expected in 1945 in view of current production and discovery of reserves

DURING 1944 the production and shipping of oil from Colombia's producing areas in the De Mares and Barco concessions were resumed on essentially the same scale as in 1941, indicating production for the current year will be between 23 and 24 million barrels.

Meantime, exploration and development activities have been going forward and important new reserves proved. Colombia can thus look forward to a producing record in 1945, with output perhaps exceeding 30,000,000 barrels.

Condor Petroleum Company of Colombia (Shell) has completed 21 producing wells in the new Casabe field in the Yondo concession, and three more were drilling at the end of October. The potential production of this field, on the basis of development to date, is estimated at 20,000 barrels daily. The company plans to begin shipping oil from the field in January, 1945, through the Andian pipe line to Cartagena.

Capacity of the 10-inch Andian line is 57,000 barrels per day, of which not much more than 40,000 barrels are being utilized by the Tropical Oil Company to move the output from its wells in the two De Mares fields. While the La Cira and Infantas fields (De Mares fields) are producing more than 50,000 barrels per day, more than 20 percent of this total is being run through the refinery at Barranca Bermeja to supply the inland Colombia market. It may therefore be assumed that initial shipments from the Casabe field could total 15,000 barrels daily and that this rate will be maintained until other arrangements can be made for handling the field's full potential.

It is generally understood that Shell plans a pipe line of its own from the Casabe field to the Caribbean coast, and a refinery at the terminal point. Presumably, this new line will be routed close to the Dificil field, a 1944 discovery. The Shell group now has two shut-in producing wells at Dificil, and plans to develop the field further as a result of these completions.

Socony Proving Cantagallo Area

Another promising development in the Barranca Bermeja area is the proving of excellent production in the Cantagallo concession of the Magdalena Valley Petroleum Company (Socony-Vacuum). Of five wells completed on the west side of the river, about 15 miles north of Barranca, two were in the 3000-barrel class. Three dry or abandoned holes on three sides of the producing tract indicate the field probably will be proved up in the direction of the river itself and may extend to the east bank, where Socony holds additional acreage. A short pipe line can feed oil from this field into the Andian line on the east side of the river. Commercial operation may get under way in 1945, in which case there would be immediate need for the projected trunk line from Casabe to the coast.

The fortunes of Colombian Petroleum Company, operators of the Barco concession, have been considerably improved by development of the Tres Bocas and Socuavo fields since 1940. Recent completions show these fields to represent a double closure on the major Tibu structure, believed to be larger than the Petrolea field to the south and to promise much greater overall yield when fully developed. Four rigs are engaged in proving up the Tibu area, where 12 producing wells have been completed. A 4-inch pipe line is carrying 1500 barrels of oil daily from the Tibu fields, via Petrolea, into the Sagoc line.

During 1944 the output of the Petrolea field averaged 11,000 barrels daily from 83 wells. There is no reason for expecting new developments involving this field, nor is it believed that further attempts will be made to find commercial production in the Rio de Oro field at the north end of the concession block. The Tibu area will get nearly all the company's attention during 1945.

Richmond Wildcatting

Richmond Petroleum Company is reported to have given up its El Retiro concession after the failure of two well-located test holes this year. This company's interest in the future possibilities of the Department of Magdalena are now centered in its Caraballo tract, south of the Bay of Salamanca and north of Shell's San Angel property. Richmond was ready to start a wildcat in the Caraballo concession in November. Socony-Vacuum and The Texas Company interests were also planning drilling explorations for 1945 in the Salamanca Bay region. Western Magdalena and eastern Atlantico departments are not nearly completely covered by concession grants or petitions for grants.

Richmond is also preparing to drill two wildcats immediately in its La Dorada concession, more than 150 miles south of Barranca Bermeja, and on the west side of the Magdalena River. Camp, roadways and water supplies have been completed and materials are being moved in for drilling. Texas Petroleum Company is preparing to drill a test well in western Boyaca about 40 miles north of Richmond's locations.

Phillips Petroleum Company plans to explore its concession block near Simiti, in the Department of Bolivar. At the beginning of November the Shell San Martin wildcat and Socony-Vacuum Floresanto wildcat were reported drilling but making slow progress. Both wells have been drilling for a number of months, and both have been in almost continuous trouble since they were spudded. The Shell operation is in western Meta, and Socony-Vacuum's test is in the Sinu Valley of western Bolivar.

Search for New Fields Intensified in Ecuador

Though no important oil field discoveries have been made in Ecuador within the last 25 years, production from existing fields in Piura has been maintained during the war period at a rate of better than 5000 barrels per day, and continuous wildcatting is being pursued in promising areas.

Exploration work in Ecuador, at this time, is confined largely to wells being drilled by International Petroleum Company and Shell of Ecuador. In the eastern part of the country, Shell has one heavy rig running in the province of Oreinte, near Arajuno, and is reported to be ready to move in two more. The well now drilling was spudded during the summer after a road was built from Shell-Mera to Banos. From Banos to Ambato on the railroad, a highway was already in use and there are railroad connections between Ambato and Guayaquil.

This highway from Banos to Ambato crosses the Eastern Andes and the railroad crosses the Western Andes range. Highest elevation on the road is about 9500 feet and on the railroad about 12,500 feet.

Rigs and materials were flown to location of the well, from Shell-Mera.

Shell's concession in the Oriente is said to cover 10,000,000 hectares.

Up the coast from Esmeraldas, on what is known as the Pacific concession, acquired within the past year, International Petroleum Company is drilling a well near Rio Verde.

International has three other rigs running in Ecuador, one about 40 kilometers west of Guayaquil, another on still another concession, and a light rig about 30 kilometers from Camarones. A recent report credited the Camarones project with a showing of oil, but International officials have said that the rumor was without foundation.

International Operations

In 1943 the same company drilled dry holes in Daular, 10 miles southwest of Guayaquil; at Cordero, 45 miles northwest of Guayaquil; at Solano, 40 miles east of Portoviejo, and finally abandoned the Lechuza test on Puna Island in the Gulf of Guayaquil. Another wildcat failure was drilled in 1944 at Engunga, four miles southeast of Chanduy on the north shore of the Bay. The Camarones test was also begun this year, as was Carizal 1, 25 miles northeast of Santa Elena. The latter operation was shut down for a long period last summer, but was drilling again in October and November.

An important discovery in the eastern area undoubtedly would be followed by other tests and the development of needed mountain roads. A pipe line 125 miles long would allow oil to be brought within reach of river barge facilities on the Rio Palengue.

It is 60 miles from the wildcat location to Ambato on the Quito-Guayasuil railroad. Equipment and supplies for the operation were hauled by truck from Ambato to Mera, then carried over the eastern range by plane to the well site. Early in November it was reported that more than 1500 feet of hole had been made in the Arajuno test.

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Production in The Argentine Maintained During War by Intense Activity of Y.P.F.

Nationalized lands which now approximate 80 percent of the potentially productive area of nation are carefully developed in war period and annual output is reported in excess of 23 million barrels. Drilling declines due to rigs wearing out and inability of operators to get new units

IN SPITE of declining production of privately operated oilfield properties in Argentina and persisting shortages of drilling, production and transportation equipment, the government-operated Yacimientos Petroliferos Fiscales has been successful throughout the war period in maintaining national production in excess of 23 million barrels annaually.

This has been accomplished by proving and developing nationalized oil lands that now amount to 80 percent of the potentially productive territory within the country, effectually discouraging further exploration activities on the part of private operators.

While Y. P. F. output has increased from 12,500,000 barrels in 1940 to 16,550,000 barrels in 1943, and an estimated 17,000,000 barrels in 1944—the yield of privately operated properties has hovered around the 8-million mark and is expected to be only slightly more than 7 million for the current year.

Increases In Two Areas

Production of the Comodoro Rivadavia district during 1943 was increased by 723,000 barrels over the previous year; and in the Plaza Huincul area a gain of 647,000 barrels was registered. These increases were somewhat offset by a decline of 182,000 barrels in overall production in the Mendoza area and a small decline in the Salta fields. The net gain through Y. P. F. operations was therefore 1,177,000 barrels, and for the nation, approximately 600,000 barrels.

New Deseado Field

On June 26, 1944, Y. P. F. completed a 1000-barrel wildcat well on the north side of the Rio Deseado, at a location 45 miles southwest of Comodora Rivadavia production. This well was completed at a depth of 5261 feet, with a 10-foot pay zone. Previous wells drilled in the vicinity were abandoned after striking basalt sills at higher levels. At the end of August two other wells were underway east and west of the discovery well. If they are successful the new field will be connected by pipe line with the storage plant at Comodoro Rivadavia, and more rigs will be moved in. Nine possible pays were logged in the first well, although only the deepest was tested, resulting in the flowing completion.

Development Drilling Declines

During 1943, field development drilling was at a much lower level than in the preceding 3 years, as shown in the following table, covering Y. P. F. operations:

	Meters Drilled	Completions
1940	118,026	108
1941	153,775	136
1942	161,551	146
1943	127,476	97

The 97 Y. P. F. field completions resulted in 90 producing wells, of which the majority were in the C. Rivadavia area, as shown in the following table:

	Completions	Producers	Dry
C. Rivadavia area	61	57	4
Plaza Huincul area	22	21	1
Salta-Jujuy area	8	6	2
Mendoza area	6	6	0
Total	97	90	7

In addition, 44 wells were successfully deepened in the C. Rivadavia area, 6 in the Plaza Huincul area, and 1 each in the Salta and Mendoza areas.

The decline in drilling can be attributed to the wearing out of equipment and the great difficulty in obtaining new supplies from United States manufacturers. Argentina is attempting to become more self-sufficient by initiating petroleum equipment industries of its own. Pumps, simple bits and collars are being turned out in small quantities.

Exploration Results

With the exception of the announcement regarding the new field discovery well drilled southwest of Comodoro Rivadavia, details are lacking as to the extent and results of exploration operations in Argentina during 1944. It is known, however, that the C. Rivadavia field has been considerably extended to the east, under the waters of the Gulf of St. George, by directional drilling from near-shore locations. Deep testing within the limits of several pools in the field area has, in addition, proved up new reserves of some importance. A new deep pay is under development in the Tupungato field, Mendoza Province, and the Plaza Huincul field is being extended to the west and south.

The deepest well drilled to date in Argentina (10,048 feet) was completed as a new pay producer in the Tupungato field early in 1943, setting off the renewed development of this field that is in progress. A wildcat begun in 1942, near Charata, in Chaco Territory, was abandoned in the summer of 1943 at 4578 feet. No oil shows were encountered.

Of 24 extension tests, deep tests and actual wildcats completed in the C. Rivadavia area in 1943, nine were completed as oil wells and one as a gas well. In the Mendoza area 2 were successful out of 4 completed. In the Territory of Neuquen one out of six deep test wells was successful and five extension tests were brought in as producers. No exploratory wells were drilled in the Salta-Jujuy region during 1943. At the beginning of 1944 there were 13 exploratory well operations in progress in various parts of the country.

Geological and geophysical investigations reached their all-time peak in Argentina in 1943 and 1944, as a result of keeping parties in the field the year around. Most attention was given to the lands along the eastern front of the Andes, although surveys were carried almost to the Atlantic coast through the southern part of the Province of La Pampa and northern Rio Negro. During 1943 alone, approximately 3000 square kilometers of territory were geologically mapped. According to Y. P. F., gravimetric surveys carried on in 1943 covered 49,285 square kilometers; 19,914 square kilometers were seismographed; and 12,610 square kilometers were surveyed by magnetometer. Special attention was called to the mapping of a large, previously unknown structure in central Neuquen Province.

Germans Develop Fields In Southwestern France

Discovery of a small oil field and part development of three fields in the Gascony region of southwestern France is reported to have been accomplished under German auspices within the past two years. Latest reports prepared by German technologists reveal that 9 wells were drilled in the area up to the end of 1943, resulting in 2 oil strikes, 5 gas wells and 2 dry holes. At that time three more operations were in progress there.

As for the location of the new fields, it is presumed that they are confined to the large Cretaceous anticline that is a major surface feature in the St. Gaudens section of Haute Garonne, 50 miles southwest of Toulouse, where test drilling was in progress before the outbreak of the war. A small oil well and several gas wells were completed there in 1939 and early 1940, but were shut-in pending further financial backing.

Geologists familiar with the area agree that the possibilities are good for establishing important commercial production under competent management. The St. Gaudens structure was declared a national reserve area before the war.

According to the German report a gasoline absorption plant was erected at St. Gaudens in the early part of 1943, and since that time 120,000 cubic meters of dry gas per day has been piped to Toulouse.

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WAR DEPARTMENT
OFFICE OF THE UNDER SECRETARY
WASHINGTON 25, D. C.

14 October 1944

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of the McEvoy Company
600 Milby Street
Houston, Texas

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You have continued to maintain the high standard which you set for yourselves and which won you distinction more than six months ago. You may well be proud of your achievement.

The White Star, which the renewal adds to your Army-Navy Production Award flag, is the symbol of appreciation from our Armed Forces for your continued and determined effort and patriotism.

Sincerely yours,

Robert P. Patterson
Under Secretary of War

McEVOY COMPANY
OIL WELL EQUIPMENT
HOUSTON, TEXAS
October 19, 1944

Honorable Robert P. Patterson
Under Secretary of War
War Department
Washington, D. C.

Dear Mr. Patterson:

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We are proud of the White Star. We want to continue to merit this award so that, in the years to come, we shall have no regrets about the part we played in the greatest event in history.

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Mexico Headed for Minor Place in Early Postwar World Petroleum Affairs

Decrease in the nation's potential production, steady increase in domestic requirements and inadequate facilities of distribution account for gloomy outlook unless drastic changes are forthcoming soon. Heightened oil activity is entirely up to Petroleos Mexicanos, the government petroleum administration

By CURTIS VINSON

UNLESS drastic changes are made soon, the Mexican petroleum industry gives little promise of playing more than a minor role in world petroleum affairs during the early postwar period. This conclusion is based on a careful analysis of the condition of the industry in the final quarter of 1944.

Three major factors contribute to this prospect:

1. Gradual decrease in Mexico's potential production;
2. Steady increase in domestic needs;
3. Inadequate distribution facilities.

Of the three, informed sources believe that the latter perhaps presents the most difficult problem.

No New Producing Areas

The decrease in potential production is accounted for by the customary, to-be-expected decline in flow over a continuing period, plus the lack of development of new producing areas. Failure to develop new fields during the six years of government operation is particularly noticeable. The yield of existing fields has been maintained and new producers completed in the rich Poza Rica region have kept production up. But this situation, unaided by the opening of new pools, can have only one result in the end. Petroleos Mexicanos (Pemex), the government oil administration, drilled only 100 wells from March, 1938, date of expropriation, through December, 1943. Ninety-six of these were put down in proven areas.

Frequent Failures

Pemex's exploratory efforts have been meager and for the most part ineffectual. Five wildcat wells were completed as failures from the time of the 1938 expropriation through the first nine months of 1944. Four wildcats are now drilling.

The five failures were as follows:

Rancho Nuevo 1, Lot 60, San Diego de la Mar, state of Veracruz, four miles northwest of the famous old Dos Bocas well, presumably the greatest in the storied Golden Lane area. This operation, apparently an attempt to find a structure in echelon with the Golden Lane production, got salt water at 6600 feet.

Santa Inez 1 and 2, near Guerrero, San Luis Potosi state, about 30 miles southwest of the famous oil town of Panuco. These two holes found salt water.

Horcones 1 and 2, efforts to extend southward the Golden Lane area, Veracruz state, found salt water and dry holes, respectively.

Wildcats Drilling

The four wildcats now drilling are:

Mision 1, Tamaulipas state, just south of the Texas border.

Aragon 2 and Soledad 1, Veracruz state, 15 miles west of the old Golden Lane structure and just north of the Tuxpan river. These operations are probing for production in the Tertiary sands.

Ojital y Potrero 3, Veracruz state, just south of the Poza Rica field.

While Pemex has announced plans from time to time for extensive exploratory programs, its wildcatting activity has never approached a degree considered necessary for future development. In January, 1944, General Manager Efrain Buenrostro announced the biggest budget in the administration's history—an estimated 394,000,000 pesos in income as against 342,000,000 pesos in expense. This budget called for an extensive exploration program with the drilling of at least 20 holes in about 30 new zones. The four wildcats now drilling, however, represent current exploratory efforts.

Up to Pemex

Inasmuch as Pemex is in complete control of the Mexican industry, the prospect for increasing production is wholly a matter of Pemex discretion. Private enterprise can only operate with the consent and cooperation of the government administration. So far there has been little encouragement by Pemex of private initiative.

Informed circles estimate the decline in potential Mexican crude production, now placed at about 145,000 barrels daily, at 10 percent a year. Domestic consumption, exclusive of imports, is now running around 90,000 barrels daily. Conservative estimates put the increase to be expected for domestic needs at about 6 percent annually.

On the basis of these estimates, it can be seen that within four years, or by 1948, Mexico's domestic needs will be in excess of potential production—un-

Mexico Crude Oil Production and Producing Well Data

Name of District and Field	Discovery Year	PRODUCTION DATA—(in U. S. Barrels) Daily Average July 1 1944	Total Production During First 6 Months 1944	Total Yearly Production During 1943	During 1942	During 1941	Total Production For All Years Thru 1943	OIL PRODUCING WELL DATA NUMBER AS OF JANUARY 1, 1944 Producing Depth Ranges (Feet)	Natural Flowing Wells	Wells Pumping	Wells on Gas or Air Lift	Wells Closed in	Wells Abandoned
Northern District:													
Tampico-Panuco	1901	8,900	2,090,000	3,150,000	3,670,000	6,015,000	765,050,000	2000	430	....	....	240	950
Southern District:													
East Flank	....	50	30,000	50,000	45,000	25,000	1,850,000	.....	....	....	....	....	....
Western Group	....	70	12,000	30,000	25,000	30,000	2,575,000	.....	....	....	....	....	....
Main Belt (Golden Lane)	1910	18,280	3,523,000	6,410,000	3,780,000	5,545,000	1,039,255,000	.....	....	....	....	.....	....
Total Southern	....	18,400	3,565,000	6,490,000	3,850,000	5,600,000	1,043,680,000	1200–2000	175	....	....	90	335
Poza Rica	1931	59,400	10,290,000	20,500,000	22,080,000	25,350,000	192,370,000	7500	34	....	....	11	....
Isthmus of Tehuantepec	1909	14,200	2,534,000	4,750,000	5,120,000	5,920,000	127,130,000	2000–4000	190	?	?	30	150
Others (Nitamaulipas, etc.)	....	.....	.....	.....	.....	(Gas)	.....	.....	.....	....	....	....	....
TOTAL MEXICO	....	100,900	18,479,000	34,890,000	34,720,000	42,885,000	2,128,230,000	1200–7500	829	?	?	371	1435

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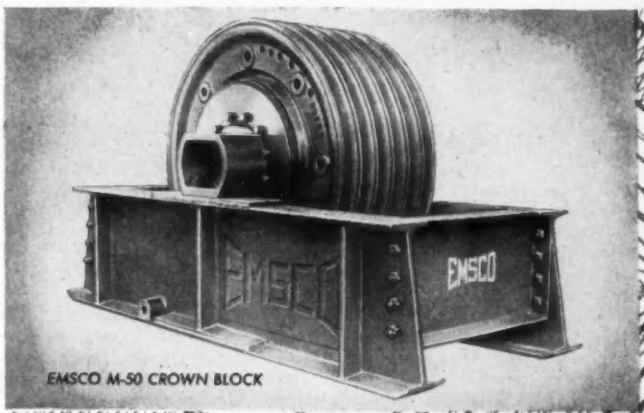
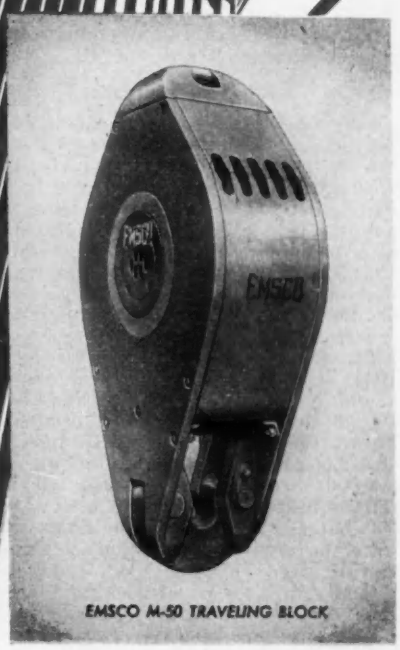


EMSCO M-50 CROWN BLOCK



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Drilling Activity in Mexico

Name of District and Field	NUMBER OF WELLS DRILLING ON JULY 1, 1944			NUMBER OF WELLS COMPLETED												Total Wells Completed All Years Through 1943
				During 1943				During 1942				During 1941				
	Total	Rotary	Cable	Total	Oil	Gas	Dry	Total	Oil	Gas	Dry	Total	Oil	Gas	Dry	
Northern District	4	4	....	7	1	..	6	9	1	..	8	11	2	..	9	4,370
Southern District	2*	2*	....	2	..	..	2	2	..	..	2	..	..	..	..	1,308
Poza Rica Area	4	4	....	4	4	..	..	3	3	..	..	5	4	..	1	50
Isthmus of Tehuantepec	3	3	....	2	2	..	..	2	..	..	2	12	7	..	5	601
N. Tamaulipas	1	1	....	1	..	..	1	2	..	2	..	1	..	1	..	43
All Other Areas	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	164
Total Mexico	14	14	....	16	7	..	9	18	4	2	12	29	13	1	15	6,635

* Wildcats.

less, of course, some drastic change is effected.

The matter is presented more clearly in figures. Taking 145,000 barrels daily as Mexico's existing potential yield, and assuming that this will decrease at the rate of 10 percent a year, the potential production in 1948 would be about 106,000 barrels daily.

Against this is taken the existing domestic needs of 90,000 barrels daily. If these needs, as it seems conservative to estimate, increase 6 percent annually, the total of domestic needs in 1948 would be in excess of 107,000 barrels daily, or more than the potential daily production. Should this be the case, exports would have to go by the board.

The figures on actual crude production present another and less optimistic picture. Actual crude production during 1943 was 95,600 barrels daily, divided by fields as follows: North Field, 8650 barrels; South Field, 17,800; Poza Rica, 56,150; Isthmus area, 13,000.

As previously cited, the potential daily yield of these fields is estimated at 145,000 barrels, with Poza Rica in the lead. De Golyer, after studying Pemex records, set the potential of Poza Rica at 60,000 barrels daily. The estimated decline in potential yield is figured on the theory of operation at full capacity, a situation that seems in store unless new producing areas are developed.

Ratio of Increase

The ratio of increase of Mexico's domestic consumption is shown by the following: For 1941, 73,000 barrels daily, with exports in excess of 43,000 barrels daily; for 1942, 79,000 barrels daily, with exports below 18,000 barrels; for 1943, 86,500 barrels daily, with exports about 15,000 barrels daily. These figures do not include imports, statistics on which are not available because of wartime restrictions.

Mexico's production the middle of 1944, or on July 1 of this year, showed a jump over the 1943 average, being 100,900 barrels daily. Total production during the first six months of 1944 was 18,479,000 barrels, as compared with 34,890,000 barrels for all of 1943, with 34,720,000 barrels for 1942, and with 42,885,000 barrels in 1941. These totals illustrate the gradual decline in yield, previously cited.

Wells drilling in Mexico on July 1, 1944, totaled 18, with four operations suspended. All operations are rotary. Completions in 1943 totaled 16, of which seven were oil wells. Six were dry holes and three were abandoned. Total of wells completed in all years through 1943 is shown as 6635.

Distribution facilities, that is to say, lack of adequate facilities, has given Pemex a lot of headaches. Late in September, the Poza Rica-Mexico City pipe line, serving the big refinery at Atzcapotzalco which supplies the Federal District and the most heavily populated region of the country, suffered several breaks during excessive floods. Mexico City had to get along on drastic gasoline rationing for a week or two until the breaks were repaired. Rail service apparently has been inadequate for proper distribution. Early in September, President Manuel Avila Camacho in a public statement declared that "owing to the lack of adequate means of transportation, Pemex has arrived at the maximum of domestic sales."

The President said further that large sums would have to be invested to carry out a program for extension of the pipe line system and modernizing refinery equipment. He added that new pipe lines could not be put into operation until the end of 1946.

Public Pays

Mounting costs in operation of the industry are being passed along to the public. In September, a new collective labor contract between Pemex and workers was signed for 1945 and 1946. This contract, effective September 8, granted the 16,000 workers of the industry approximately 4,500,000 pesos (about $900,000) annually in increased social benefits.

Previously, on July 1, the President, intervening in the workers' fight for increased wages—a fight that had threatened a general strike in the industry—granted workers an increase in wages, and other benefits, of 24,000,000 pesos (about $5,000,000) annually. These two awards will give the workers an annual increase in wages and other benefits for the next two years of 28,500,000 pesos, or about $5,900,000.

On the heels of these awards, price increases for gasoline and other petroleum products were announced. The gasoline price was upped two centavos a liter. The amount Pemex will distribute in salaries and social benefits to the workers this year represents approximately 51 percent of the value of production, as compared with the average in other industries of transformation of 17.7 percent, the President said.

The proposed refinery in Mexico City for producing 1000 barrels daily of aviation gasoline is still a project, though certain machinery and materials have reportedly been obtained.

Pemex is understood to be dealing with Washington in an effort to get an agreement whereby the United States will help find markets for Mexican export products, especially refined products. It is reported that through such a deal Pemex hopes to buy in the United States such products needed to supply those regions in the country at inconvenient distances from Mexican refining facilities.

China Is Awake to Its Petroleum Possibilities

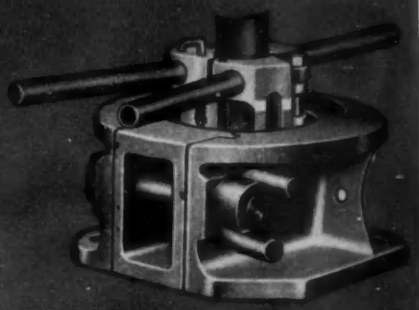
In the past ten years Chinese authorities have come to realize not only the need for discovery and development of oil fields but also the genuine possibilities that exist within the great interior areas. At the time that Japan began the invasion of China, explorations were well under way in a number of localities, and the movement to organize a national oil industry was in an advanced stage.

For all practical purposes this work has been halted by the war, although enough drilling has been done to verify the presence of oil in commercial quantities in at least two localities. The Chinese National Oil Administration succeeded in opening the Lanchow field in central Kansu province in 1939. It is reported that the field has 14 producing wells, being operated at about half their total potential yield rate of 5000 barrels daily. The output is crudely refined in a small skimming plant to provide gasoline for local use by government trucks. Nothing more can be done to further develop the field or install suitable refining facilities until the military situation is cleared up and the region can be made more accessible through railroad extension.

Work by Russians

Seven hundred miles northwest, in Sinkiang province, another small oil field was opened in 1941. Exploration and drilling was carried on by Russian engineers and crews, by arrangement between the two governments, after which the field was turned over to the Chinese for operation. It is not that nothing important has been accomplished since. Sinkiang province, though, in the very center of Asia, is known to have a number of large oil seeps, and is believed to be the region of greatest oil possibilities in all China. It is also the most remote and least developed.

Other promising areas, marked by the presence of oil seepages, are known in the interior of China, but their inaccessibility rules them out from the standpoint of attempted development in the immediate postwar period. There remains the great Red Basin of Szechwan province, where Chinese geologists are concentrating their attention in preparation for an intensive search as soon as conditions permit. Oil is known to be present in Mesozoic strata there, but has been found in only small amounts. The possibilities of lower beds, in the Paleozoic series, particularly of Permian age, have been pointed out and will be investigated thoroughly.



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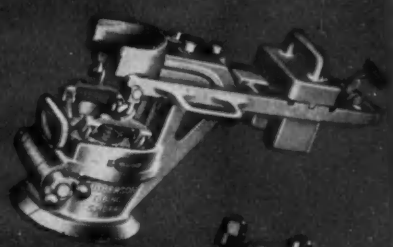
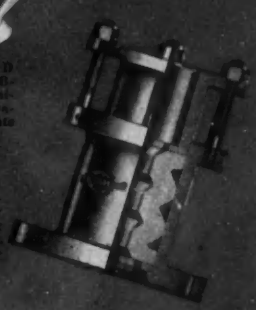


HEAVY AND HEAVY TYPE TUBING SPIDER: Semi-automatic. Supports variable sizes and weights of tubing.



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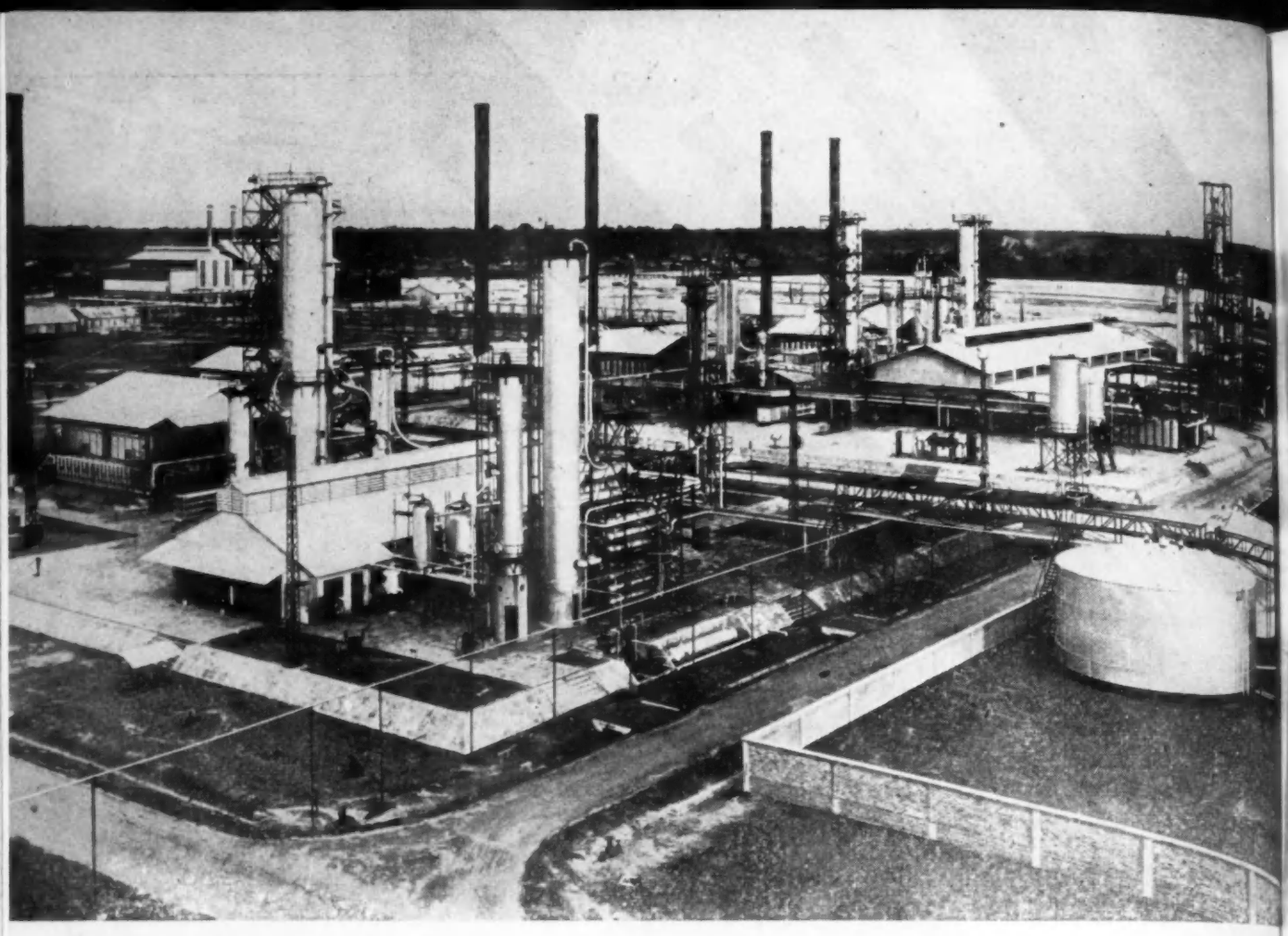

A prewar view of the Dutch Shell Company's modern refinery at Pladjoe, Sumatra. The plant had a rated capacity of 50,000 barrels daily. When the Japanese invaded Sumatra, the scorched earth policy was applied to the installation. Both photos courtesy of the Netherlands Information Bureau.

East Indies Postwar Prospect

Plans for reconstruction following destruction by war are being actively pursued by the Royal Dutch Company

By Netherlands Information Bureau

INFORMATION on the rich oil fields in the Netherlands East Indies under Japanese occupation is scant and of little significance. Immediately after the occupation, the Japanese boasted that the oil fields were again in operation. Although these statements were premature and exaggerated, there is no doubt the Japanese have succeeded in getting certain quantities of oil from the Netherlands East Indies. The best proof of this is the recent bombings of the Borneo fields by the Allies. In February, 1943, Secretary of the Navy Knox said the Japanese were obtaining oil production from the shallow wells in Borneo.

Knox also stated that not all installations in the Indies had been destroyed, and that some were undoubtedly in use by the Japanese. Prior to the war the oil supply in Japan, as in Germany, was extremely stringent. With production of synthetic oil still in the experimental state, Japan produced only 8 percent of its consumption—400,000 metric tons (2,960,000 barrels) in 1936—depending on imports for a large part of its demands which totalled 5,000,000 metric tons (37,000,000 barrels) annually. On the other hand, prior to the war, the annual output of oil in Sumatra totalled 5,300,000 metric tons (39,220,000 barrels); in Borneo 1,810,000 metric tons (13,394,000); in Java 840,000 metric tons (6,216,000 barrels); in Geram 100,000 metric tons (740,000 barrels); and in Burma 1,100,000 metric tons (8,140,000 barrels).

Production Spurned

At the same time the Japanese government continued to increase domestic oil production under the unified rational control of the Imperial Oil Company, semi-governmental corporation authorized to take all necessary means for bolstering domestic production. Similar efforts are being directed toward refining operations under the control of the Oil Refiners Council, created in 1942.

Japan has been enjoying a certain advantage due to the geographic nearness of oil sources. While production on the Allied side is large and plentiful, its transportation routes to consumption centers in war theaters are long. For instance, 6000 nautical miles separates California oil fields from the battle line in the Western Pacific.

This advantage, which the Japanese like to stress, is naturally limited by the fact that it is uncertain how much oil they are getting out of the occupied regions of Southeast Asia. Although a Japanese spokesman stated in the early days of the occupation that the Japanese were coming to liberate 10 million Indonesians, and not for oil, they began their invasion of the Indies in 1941 with the oil producing island of Tarakan, off the northeast coast of Dutch Borneo.

Tarakan production, although on the decline in recent years, was about 10,000 barrels per day in the first half of 1941. The oil can be used as fuel oil without processing. Another island, about 20 miles from Tarakan, also produces oil, but in small quantities.

The next area which fell to the invader was Borneo, another important oil producing region. The fields are located in the Samarinda area in the southeast part of the island along the shores of the Macassar Strait. They include the Sanga Sanga and Sambodja fields, which produced more than 10,000,000 barrels of oil per year. This oil was processed

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Panorama of Balikpapan, oil center on Borneo, as it appeared before the war.

at the refinery of the Bataafsche Petroleum Maatschappij at Balikpapan. Combined production in this area in 1940 was 1,793,148 metric tons or 13,169,295.2 barrels. This represented 22.6 percent of the Netherlands East Indies production.

Sumatra Important

The most important oil fields of the Netherlands East Indies are located in Sumatra. In the last 15 years production in Sumatra has been steadily on the increase and in 1940 it totaled 5,200,709 metric tons or 38,485,246.6 barrels, equivalent to 65.6 percent of the production of the Netherlands East Indies. About half the refining plants are located in Sumatra at Pangkalan Brandan and Pladjoe near Palembang. Two, including the largest refinery in the Netherlands East Indies, belong to Shell (B.P.M.) and another, the second most important, to the Nederlandsche Koloniale Petroleum Maatschappy. The latter company is a subsidiary of Standard-Vacuum Oil Company, formed by Standard Oil Company (New Jersey) and Socony-Vacuum Oil Company. Both companies have produced high octane aviation gasoline since the spring of 1940.

The oil production in Sumatra in the provinces of Palembang Djambi, Sumatra's East Coast and Achin has risen enormously and steadily since 1924 except for a short interruption in 1931. The wells in Djambi, started in 1923, have given excellent results. In 1939, Djambi produced 1,200,000 tons (8,880,000 barrels) of oil. The increase in output in Palembang also accounts for the steady increase of the Netherlands East Indies production, whereas in all other oil producing countries a decrease after 1931 is noticeable.

The area next in output is Java, especially in the central and eastern parts. Production has been irregular over the period. After an increase in 1927-29, a slight decrease was noted, which made way for another big increase in 1936 due to exploitation of the so-called Patih block in East Java by B.P.M. (Shell).

Wells in the Moluccas are rather old. They started production in 1914 and increased rapidly in output until 1921, when production leveled off until 1934.

In 1936, exploration activities were started in New Guinea but when war broke out, no commercial production was available. All installations of the N.N.G.P.M. were destroyed by the Dutch in 1942.

Production by Companies

Production of the different companies is given in Table 1. It shows that the B.P.M. (Bataafsche Petroleum Maatschappij) of the Royal Shell group, the Ne. Kol. Petr. Mij. (Nederlandsche Koloniale Petroleum Maatschappij) of the Standard Oil, Vacuum group and the Ned. Ind. Aardolie Mij. (Nederlandsche Indische Aardolie Maatschappij) a combination founded December 14, 1921, by the Netherlands East Indian government and the B.P.M., control the whole production.

TABLE 1
East Indies 1939 Production by Companies

COMPANY	Metric Tons	Barrels*	Percent
B. P. M.	4,500,000	33,300,000	56.4
N. K. P. M.	2,100,000	15,540,000	26.9
N. I. A. M.	1,300,000	9,620,000	16.6
Other Companies	1,000	7,400	0.1
	7,901,000	58,467,400	100.0

*Conversion on basis of 7.4 barrels API 36-gravity oil to 1 metric ton.

In 1921 B.P.M. controlled 99.8 percent of production but since then the importance of other companies has been steadily growing. B.P.M. has the greatest regional dispersion; N.K.P.M. has all its output concentrated in Palembang except for small fields in Achin and Middle Java.

N.I.A.M., founded for the exploitation of the Djambi fields, works mainly in this province, but has also produced oil in Sumatra's east coast since 1928. However, in 1939 1,200,000 tons (8,880,000 barrels) of the 1,300,000 tons (9,620,000 barrels) were still produced in Djambi.

Exploitation in New Guinea has been by an agreement of May 23, 1935, with the Nieuw Guinea Petroleum Maatschappij. Company stock is owned by B.P.M. to the extent of 40 percent. Another 40 percent is owned by N.K.P.M. and 20 percent by Nederlandsche Pacific Petroleum Maatschappij.

Destruction of oil installation had been planned carefully long before the Japanese invasion. Work was carried out by the military authorities but many oil technicians had joined the army at the oil centers under the mobilization scheme. They helped the military to destroy the centers. Whole settlements, in some cases entire towns, were destroyed.

Destruction of a great number of oil wells is not an easy matter. At Tarakan and Balikpapan there were about 1000 wells, some of which averaged only a few tons a day. Some were plugged, while explosives were used to blow up the refineries.

It has been estimated that by destroying Tarakan, Balikpapan and Palembang the Dutch cut off 88 percent of the oil available in the Indies.

Restoration Slow

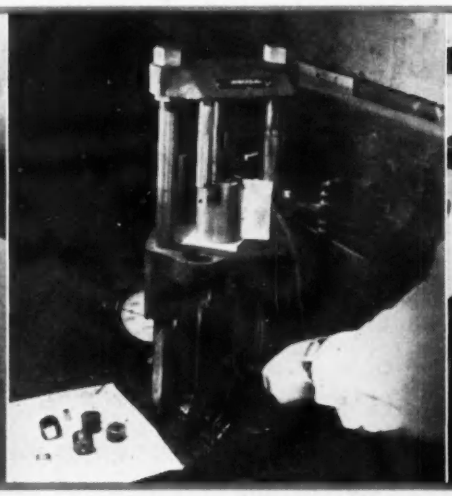
It is difficult to say how long and how costly it will be to restore the oil installations. In the first world war, wells in Rumania were destroyed in a much less effective way than the destruction on the Netherlands East Indies. Yet it took the Germans more than two years to put half the wells back in operation. It must be considered in this connection that the Germans had better technicians, more machinery and far easier communications with the homeland than the Japanese.

The Royal Dutch Petroleum Company reported on July 26, 1943, that the destruction in the Indies had been complete with the exception of a small part of the Pladjoe refinery. Japanese paratroops were dropped in the Pladjoe refinery, so it was not possible to complete destruction.

It is known, however, that vital parts of the refinery were rendered useless and the jetties partly destroyed. Installations were afterwards shelled and finally bombed by Netherlands Indies fliers.

The report also gave some idea of the reconstruction plans of the Royal Dutch. "Planning for reconstruction is now actively pursued. The company's entire net income for 1942 (32,811,113 guilders) has been added to its special reserve against further contingencies, raising the reserve to 72,000,000 guilders."

Here is the first step in preparing a representative steel sample for examination. In the picture above, a cutting off wheel is being used to cut hardened sections. The gears in the foreground will be cut on a power saw and sections removed for study.

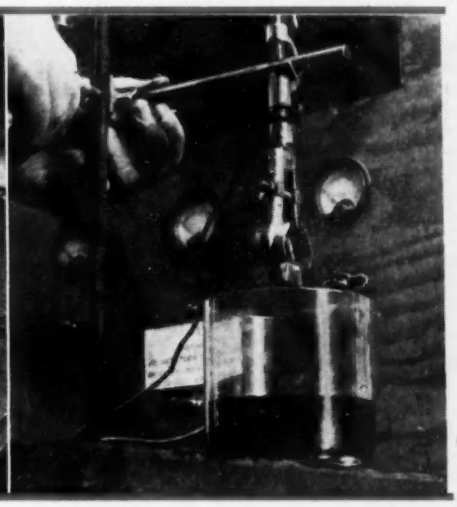


Pieces too small for easy handling are mounted in a thermal setting plastic, using the hydraulic press above. The combination of 3000 p.s.i. pressure, and a temperature of 300°-320° F. changes plastic powder into a solid cylinder which holds the specimen during grinding and examination.

Mounted or unmounted, the specimens must be ground flat. After an emery wheel has removed large burrs, the specimen is taken to a flat belt grinder (above), where the surface is made flat, with all scratches running in one direction.

The next polishing step is done on a series of emery papers laid on a flat surface. Rubbing is done in one direction only, with the specimen rotated 90° on each successively finer grit paper, until it looks smooth under a 7 x power glass. It is ready for the polishing lap.

The last step in manual polishing is carried out on this lap. The broadcloth covered disc, rotating at either 750 R.P.M. or 1250 R.P.M., is covered with a fine abrasive and wetted with water. Three wheels, with varying grit abrasions, produce the final mirror polish.



In certain cases electrotytic polishing, which removes an infinitesimal layer of the metal surface through anodic polishing, is used to make microscopic structures even more readily visible.

Now the sample is ready for etching. Etching requires patience and skill to bring out the desired contrast of sequence. Watch glass, etchings, solvents, wash bottles, hot and cold water, hot air dryer—all come in handy.

After the specimen is viewed optically and photographed for the record, as shown opposite, as a final step, contact prints or enlargements are made from the resulting negatives in the completely equipped photographic darkroom.

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Australia Plans Intensive Postwar Search for Oil

Exploration in progress for 40 years but results have been disappointing and requirements have been brought in from Netherlands East Indies. Geologist says that Permo-Carboniferous strata offer best possibilities. Government is certain to regard search for petroleum as worthy of its energetic support when war is ended.

DESPITE searches that have been carried on for 40 years, involving the expenditure of more than £4,000,000, oil in commercial quantities has not been found in Australia or British New Guinea. Consequently, except for small amounts of oil derived from oil shale and the unimportant Lakes Entrance field near Melbourne, Australia's petroleum requirements have been imported—in late years mostly from the Netherlands East Indies, until the outbreak of the war with Japan. This information comes from Australian News and Information bureau via radio from Canberra.

Since the most promising territory has been within actual or threatened combat areas during the war period, the general search has had to be temporarily discontinued. Furthermore, their exploration and testing are necessarily long-term propositions, and mere discoveries could have had no bearing on the outcome of the war.

New Guinea offers greater chances of commercial oil discoveries than Australia itself, if experience is any criterion. Seventy percent of the world's oil comes from geologically young Tertiary strata that were deposited in great Mesozoic geosynclines. Such features are not present in Australia, but New Guinea lies in one of these belts.

Dr. William Woolnough, former Commonwealth geological adviser, believes that although there are large areas of Tertiary rocks in Australia that are analogous with those which yield oil elsewhere in the world, no evidence has been found that necessary structural closures have been developed in them. It is his opinion, therefore, that Permo-Carboniferous strata offer the best possibilities in Australia.

Thick Tertiary beds extend almost without interruption, and without structural disturbance, from southeast Victoria to the Esperance area in Western Australia, but only in the vicinity of Lakes Entrance, Victoria, has the presence of oil been confirmed. Shallow holes encountered non-commercial saturations there in 1930, in glauconitic sandstones of Miocene age, lying at an average depth of 1200 feet. Semi-commercial production has been proved over an area of eight square miles.

Horizontal Experiment

In 1940 the Commonwealth government, the state of Victoria and private operators combined to form the Australian Oil Drilling Syndicate and Leo Ranney and Charles O. Fairbank, American petroleum engineers, were retained as advisers. On their recommendation a shaft is being sunk to the producing level and efforts will be made to operate the central part of the field by horizontal wells at the shaft bottom.

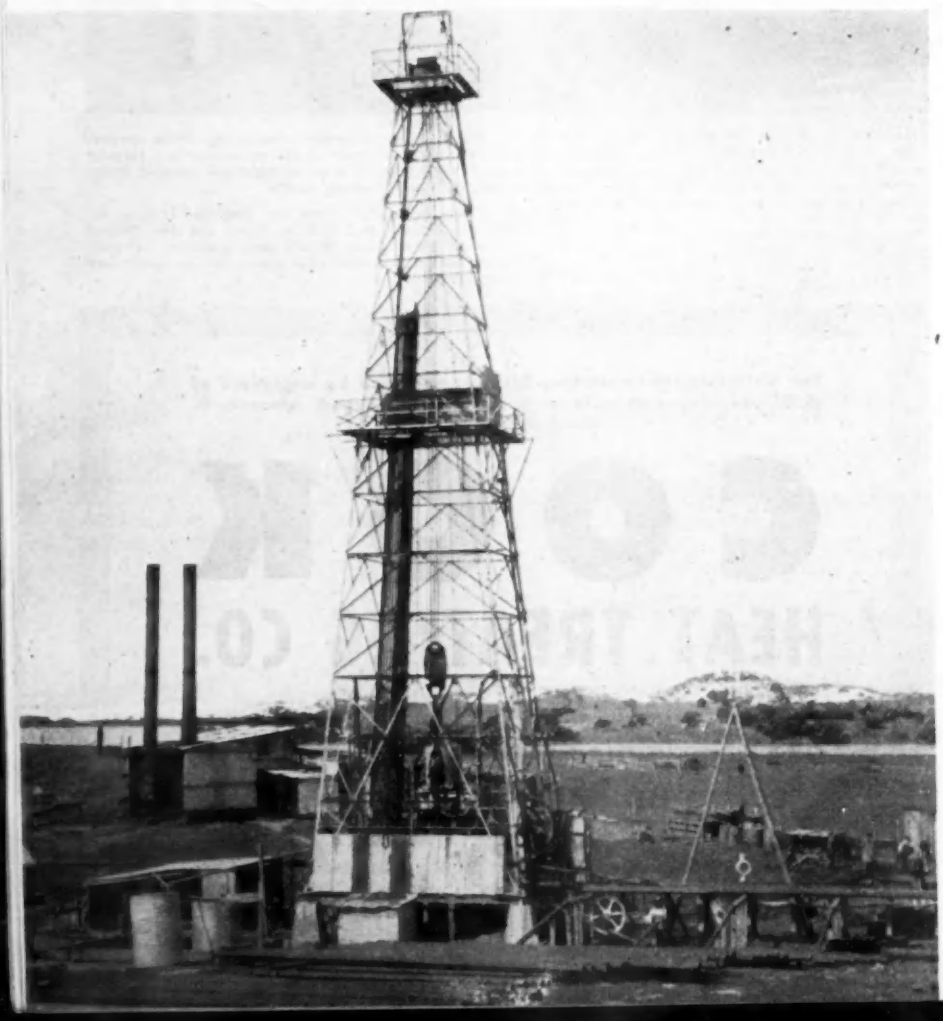
Exploitation of shale oil deposits is in progress in the Glendavis area of New South Wales, and although the cost of extraction is higher than the cost of imported crude oil, operations are proceeding for reasons of national emergency.

New Guinea Ventures

In 1919 the Anglo Persian Oil Company made an agreement with the British and Australian governments for exploratory drilling in Papua. Each government appropriated £50,000 to defray expenses. Three wells were put down and abandoned as dry holes, and by 1921 the £100,000 were exhausted. The British government then withdrew from the enterprise. Australia bought out the British government rights for £25,000 and authorized the company to continue operations as an agent of the Australian government. Drilling difficulties led to suspension of the venture in 1926, after more than £227,000 had been spent. The Anglo Persian company drilled two more dry holes in Papua in 1928. From 1936 until the invasion of New Guinea in 1941 three other Australian-subsidized companies carried on field work and test drilling in Papua, without the discovery of any commercial oil fields.

In Queensland, drilling has been con-

Below: Deepest rotary-drilled well in Australia. Location is at Nelson, Victoria, and depth 6425 feet.



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fined to the Roma district, except for a single hole near Longreach. In the Roma area drilling has been going on at intervals since 1900, and probably 260 wells have been drilled there, of which at least 20 were comparatively deep tests. In 1908 a government well struck gas at 3702 feet and caught fire. It burned for six weeks and was then deepened 11 feet without encountering oil. In 1916 the Queensland government gave a contract to J. H. Whaley, an American driller, who undertook to test the oil possibilities of horizons below the gas zone. Drilled with a cable rig, the test hole was finally abandoned in 1922 after being put to 3709 feet. Many more holes were drilled in the area subsequently, a number of them finding gas and gas-distillate flows, although no oil or distillate was found in commercial amounts. Since 1939 Shell Queensland Development Company has been carrying on geological and geophysical work in the area, but has not drilled any test wells. Altogether approximately £1,150,000 have been spent by private companies in the search for commercial oil fields in Queensland.

In New South Wales the most important oil prospecting operations have been confined to the Permian-Triassic basin in the east-central part of the state, which includes the Hunter River and Sydney-Gosford areas. Sixteen holes have been drilled in the two districts for an aggregate footage of more than 41,000 feet. No oil has yet been discovered, although small gas flows were encountered in several wells.

Stratigraphic Test in Victoria

The Australian and Victorian governments are jointly financing a stratigraphic hole in western Victoria to establish the Tertiary sequence in the area. Now at 6300 feet, this well has been in middle Miocene sediments throughout. This is Australia's deepest test, and has already demonstrated that the Tertiary series is considerably thicker than previously supposed.

In Tasmania, 22 holes have been drilled without results, as far as oil indications are concerned. In the state of South Australia at least 38 tests have been drilled, mostly along the coast, between Adelaide and the border of Victoria. None had oil shows.

Regarding the petroleum possibilities of West Australia, Commonwealth Geologist Dr. Harold G. Rangatt said that in the Kimberleys and the northwest basin considerable thicknesses of relatively undeformed sediments and the occurrence of oil residues in outcrops are favorable indications that should be thoroughly investigated and tested. Twenty-one holes have been drilled in the Kimberleys area and in the Fitsroy River district, some of them having encouraging oil shows. The most important test, near Nerrimba, was spudded on a surface structure in 1939, but the operation has been suspended due to the war. No drilling has been done in the northwest basin.

Now that warfare has moved so far northward, concentration on oil exploration in Australia is becoming pronounced again, with a number of leading international firms preparing to engage in exploration. It is certain that the Australian government will regard the search for domestic reserves as a postwar project worthy of its full support.

Results of Wartime Explorations In New Zealand Are Disappointing

NEW ZEALAND exploration reached a high point in 1943 as a result of efforts initiated by the Allied military command to boost the petroleum supply for southwest Pacific operations following occupation of the East Indies by the Japanese.

Before the outbreak of war its presumed inevitability led to the amending of the New Zealand petroleum act, which vested in the Crown all oil existing in its natural condition within the dominion. Licensing provisions were liberalized in 1939 and again in 1941 to encourage exploration and development by private companies.

Subsidiaries of Standard-Vacuum Oil Company and Superior Oil Company of California hold licenses on 42 blocks covering about 7000 square miles of the most promising prospecting lands on North and South Islands. New Zealand Oil Exploration, Ltd., Shell subsidiary, has three parcels of 402 square miles. Several small independent groups have also acquired rights to prospect in scattered areas.

Since 1938 at least 11 exploratory wells are known to have been drilled in New Zealand, all in the vicinity of oil seeps that are numerous in both the two large islands. The first of these wells was drilled to 5700 feet, near Gisborne, on the east coast of North Island. Oil of good quality was found, but not in commercial quantities. Engineering difficulties were blamed for failure to complete the well successfully. The deepest test, drilled to 10,925 feet, was put down at Midhurst, southeast of New Plymouth. Three unsuccessful wells were drilled in the New Plymouth area in 1943, and two in the Gisborne area, according to recent reports. Others are in progress.

The only significant production so far obtained in New Zealand is in the Moturoa field, southwest of New Plymouth, on North Island, where three wells are reported yielding an average of 85 barrels each per day. Semi-commercial finds have been made in the Gisborne region on the opposite side of the island and in the vicinity of Murchison in Nelson Province, South Island, and Greymouth, Westland Province.

Minister Webb, of the New Zealand Department of Mines, in a statement October 24, revealed that 11 oil test holes have been drilled in New Zealand during the war period, one of them going down to more than 11,000 feet. He said that private oil companies have spent to date more than $8,000,000 in the search for new oil fields on North and South Islands. Two tests are under way on North Island.

Seepages are numerous in at least ten localities. Several wells have tapped prolific but short-lived pays that have not been explained geologically, but that apparently are not present in offsetting wells. In addition, the geology of the deeper sedimentary beds in known petroliferous localities is in most cases obscured by thick gravels and clays, and in the Taranaki area by volcanic rocks at the surface. Faulting presents a further complication in the Gisborne area.

Inasmuch as the only commercial production so far obtained is in the New Plymouth area, detailed geological and geophysical surveys are now in progress in southern Taranaki and western Wellington provinces, where Tertiary rocks are believed to reach a thickness of more than 10,000 feet. The east coast of North Island, from East Cape southwestward, is the eroded rim of a Mesozoic and Tertiary basin that extends inland for many miles. Dozens of seepages have been noted along the strike of outcropping Cretaceous beds. This basin continues southwestward across most of the eastern part of South Island. Seepages have also been noted in Paleozoic beds farther south.

Below: Derrick of Taranaki Oil Company well, New Plymouth, North Island, New Zealand.

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Presto! The two units are quickly, securely joined together. Result: a strong, rigid charge that holds together even under the most adverse conditions of lowering and poling.

It's easy to make up a charge with the Du Pont "Fast-Coupler." Anyone can do it, even the most inexperienced crew member.

Write for informative booklet showing the "Fast-Coupler" in field use. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Delaware.

DU PONT "FAST-COUPLER"

It works fast . . . it holds fast

The Du Pont "Fast-Coupler" is NOW supplied in three sizes:

2" diameter cartridge . 2½ lbs. each
2¼" diameter cartridge . 5 lbs. each
3" diameter cartridge . 10 lbs. each

All three sizes are available in 60% Seismograph "Hi-Velocity" Gelatin and "Seismogel" dynamites.

DU PONT

REG. U.S. PAT. OFF.

Union of California Contracts With Paraguay for Extensive Exploration

Following conclusion of an agreement with the Paraguayan government, Union Oil Company of California is assembling geophysical crews and equipment, preparatory to exploration for oil in the Chaco territory. The contract with Paraguay covers approximately one half of the area of the country, comprising 54 to 58 million acres. The area has been set aside as an oil reserve. Exploration and development of possible oil fields, are to be conducted by the Union Oil Company of California, in partnership with the Paraguayan government.

For comparative purposes, if the area to be prospected were superimposed on the map of California, it would extend from south of Los Angeles to about 250 miles north of San Francisco and from the state line on the east, 100 miles out into the Pacific Ocean on the west.

The contract differs from a concession in that Union's position is that of a contractor for the Paraguayan government. Union is to supply the geological and geophysical talent; find and develop oil fields if there are any; and provide the necessary oil experience in drilling, transportation, refining and marketing. Negotiations were started more than two years ago, and Union has already conducted reconnaissance geological surveys in Paraguay. Actual drilling is contemplated within 18 months.

Paraguay has no oil, and the Chaco territory is not even known to be within an oil province, although it is a geographical extension of the Argentine Chaco, the site of known geophysical structures. The oil districts of Bolivia are adjacent to the Paraguayan frontier on the northwest.

The Chaco in Paraguay, is a broad, flat area, with hardly a single rock outcrop. Consequently, exploration must be conducted solely by geophysical mapping and by actual drilling. There are no known favorable structures and there is no geological section available anywhere within the area. Even should favorable structure be found by the instruments, only the drill will reveal the character of the rocks or the possibility of an oil content. Also several wells may be required to determine all the controlling factors on a single structure. The terrain is heavily wooded with a few scattered grassy areas, and although flat, the territory has few roads, making transportation, except along the Rio Paraguay, quite difficult. Thus the extension of geophysical profiles over hundreds of miles is a complicated undertaking.

The territory compares with Oklahoma territory of the early 1800 period: It is an undeveloped, sparsely settled country, containing a small number of Indians, some soldiers, and a few hardy settlers.

E. B. Noble, Max Krueger and Chester Cassel will conduct the detailed examinations for Union. Noble, manager of exploration, is in Paraguay in charge of the preliminary work.

Calgary Gives Priority Rating to Oil Workers

Indicative of the high priority rating of oil exploration in Western Canada, only about a score out of 1700 oilfield workers whose cases have been reviewed by mobilization board officials in Calgary in November are to receive draft notices. The board decided that in view of the vital nature of their work, no experienced members of oilfield crews would be called for military service. The score to be drafted are relatively inexperienced, youthful laborers.

Ecushwa Oils 1, first Alberta drilling venture of the Duke of Windsor and associates, has reached its Madison limestone objective—at 3330 feet, nearly double that originally anticipated. After setting 7-inch casing, drilling will be carried to completion in the lime. The well is on the Duke's E. P. Ranch, and is testing the Pekisko Hills section of the Highwood Uplift, a series of narrow, parallel, shallow anticlines flanking the Turner Valley oilfield to the west and south.

England Breaks Into Oil-Producing Ranks With 50,000 Barrels Monthly

Monthly production of crude oil in Great Britain now averages about 50,000 barrels monthly, from wells drilled since the outbreak of the war. Prior to that time, there was no production in England. Location of the new field is a military secret, but there are now 238 producing wells.

The oil is of a paraffinic base, comparable with high-grade Pennsylvania crude, and the wells have to be pumped.

An announcement from the British government credited the Anglo-Iranian Oil Company and its subsidiary, the D'Arcy Exploration Company as being responsible for the discovery as a result of detailed seismograph surveys that have been in progress throughout the war period. More than 1600 shot holes were put down.

The first intensive search for oil in England began during World War I, and the first well was completed near Hardstoft in Derbyshire, in October, 1919. Following passage of the petroleum act of 1934, the way was cleared for a renewed hunt for oil in Britain, and extensive exploration began, with the first major discovery made in 1939. From this, Britain's output has been boosted from 300 tons a month in 1939 to thirty times that amount last year.

Experienced American oilmen have helped develop the new field.

700 Fast Type T2 Tankers by 1946

A PICTURE of our postwar merchant marine drawn by the United States Chamber of Commerce last week indicated that if the war ends by the middle of 1946 the United States will have 700 fast type T2 tankers (see page 145-146), totaling about 11,000,000 deadweight tons.

Tanker capacity will account for nearly 25 percent of the estimated total of 48,000,000 deadweight tons of shipping which this country will possess and which, it was pointed out, is more than three times the tonnage figured to be needed if 50 percent of our foreign trade were carried in American ships.

The chamber figured that 7,500,000 tons of shipping would be required for such seaborne commerce and another 9,800,000 tons for coastwise, intercoastal and inland water transportation. No estimate was made of the tanker tonnage which may be required.

Oklahoma University Man Joins Mid-Continent Staff

Alan G. Skelton, formerly librarian of the school of geology, University of Oklahoma, has joined the Tulsa staff of Mid-Continent Oil & Gas Association in charge of the association's statistical and information services and library. Skelton also served on the Oklahoma Geological Survey and compiled and authored "A Bibliography of Oklahoma Oil and Gas Pools" which was published as Bulletin No. 63 in 1942. Skelton will work with the association's Kansas-Oklahoma division's standing committee on oil field nomenclature, including its Oklahoma and Kansas steering committees on oil field history as well as its Oklahoma and Kansas steering committees on oil field names.

☆

REX BRANNIN has been appointed superintendent for Magnolia Petroleum Company at Duncan, Oklahoma, succeeding O. H. Stout, retired.

Humble Changes

Humble Oil & Refining Company, Houston, has announced changes in supervisory forces of the production department as follows:

Walter W. Phillips promoted to district superintendent of the Hawkins District, Hawkins, Texas.

Dan C. Rhodes transferred from the Livingston District, Livingston, Texas, to the Katy District, Katy, Texas, as district superintendent.

B. H. C. Stover, district chief clerk, transferred from the Hardin District, Hardin, Texas, to the Katy District, Katy, Texas.

Harold D. Shaffer, district chief clerk, transferred from the Chalkley District, Louisiana, to the Hardin District, Hardin, Texas.

☆

SAM E. MOYER has been named controller of Parkhill-Wade, 1625 S. Alameda Street, Los Angeles. He was formerly chief accountant of the Kettleman North Dome Association, and has been associated with the oil business in California for the past 20 years.

T2 tanker en route to convoy rendezvous. Note heavy deck load of miscellaneous war supplies. United States Maritime Commission photo.

Tanker Design Development

Necessity occasions evolution of ocean carrier from wooden barrels to specialized bulk vessel

By E. L. STEWART*
Manager, Construction Division, Marine Department,
Standard Oil Company (New Jersey)

DEVELOPMENT of the oil tanker from its immature beginning to the present highly specialized carrier of bulk petroleum products was one of necessity—necessity—occasioned by the remoteness of the oil fields from home and foreign markets, the volume of the petroleum produced, and the need for a safe, practical and economical means of handling and transporting petroleum products in seagoing vessels.

At first the petroleum was transported in wooden barrels. Subsequently, to reduce the tare weight of the containers and permit of more economical stowage, rectangular-prism shaped metal containers were used. Due to the considerable leakage of petroleum from the containers—with attendant hazards of explosive gas formation, and also by reason of the relatively high cost of containers at a time when the production of petroleum was rapid, attention was directed to the possibility of handling and transporting petroleum in bulk in seagoing carriers.

The structural arrangements devised and used to effectuate such bulk petroleum transportation were numerous and varied, until in 1886, the German—conceived and English-built tanker *Gluckauf*—prototype of the present-day bulk petroleum tanker, was built. Although there is a far reach from the *Gluckauf*, of 3020 tons deadweight carrying capacity, to the large bulk oil carriers of present day commerce, the basic principles of general design embodied in the *Gluckauf* and its contemporary tankers have not undergone any material change in present application. The transition of the tanker, from vessels with propulsion machinery aft to vessels with propulsion machinery amidships and back again to propulsion machinery aft; from single deck vessels to those of two deck "poop-bridge-forecastle" type and three deck "flush" or "shelter" deck types, and back again to single deck vessels with poop-bridge-forecastle; from vessels with separate expansion trunks to those with continuous expansion trunks or just access hatchways on deck; from vessels with transverse framing to those with longitudinal framing or hybrid transverse/longitudinal framing systems; from vessels with tank center line longitudinal bulkhead and topside summer tanks to vessels with twin and triple longitudinal bulkheads in cargo oil spaces, and the various developments and uses of steam reciprocating, combined steam reciprocating and exhaust turbine, geared turbine, diesel (of four-cycle and two-cycle, single acting and double acting, air injection and solid injection; supercharging and non-supercharging) turbine-electric and diesel-electric; Scotch boilers, water tubular and exhaust gas boilers, in tankers, would entail a lengthy description. Although such a description would be of historical interest and perhaps especially intriguing to persons directly interested in tanker construction and operation, it would prove of little value in a practical consideration of the present day tanker.

Sea Service Speed

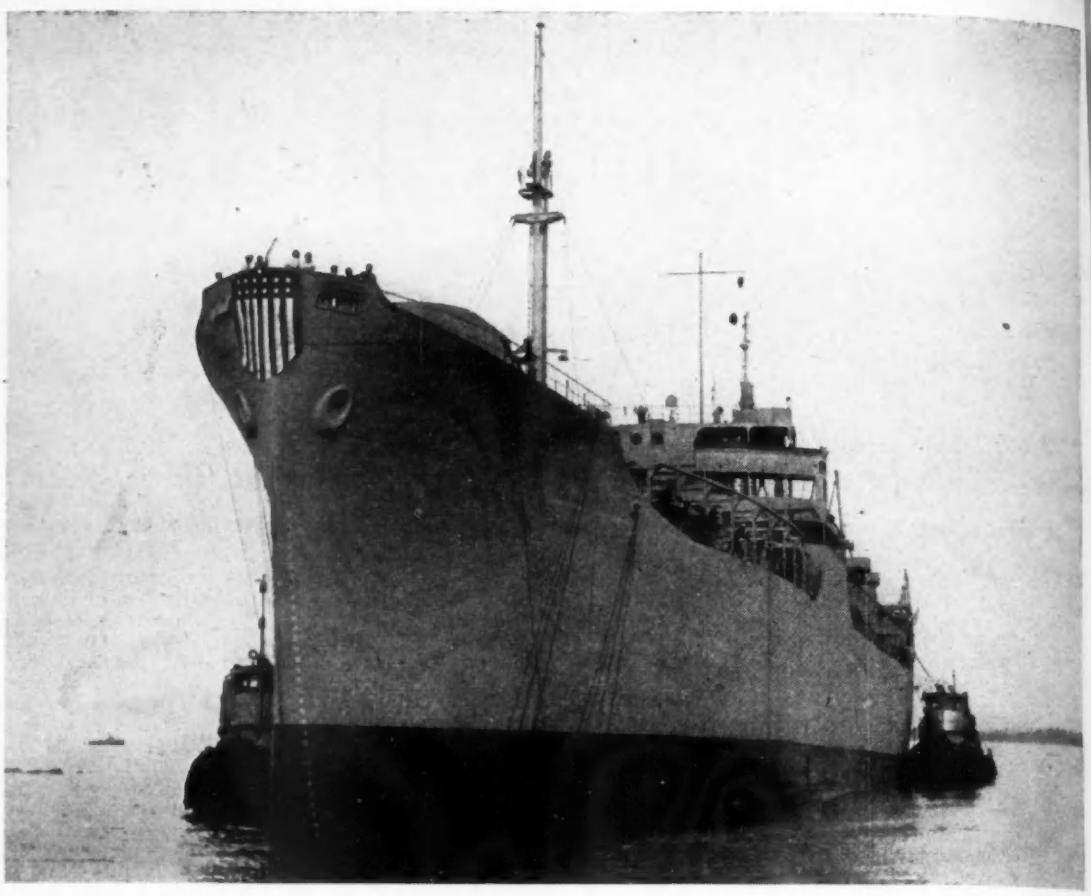
In entering into such a consideration from the viewpoint of new developments in tanker design especially as they affect speed and transportation costs, it is recognized that there can be many shades of opinions as to whether or not the present day bulk oil carrier embodies those features or developments which should provide a safe, practical, economical and readily maintained tanker to fill the needs of all normal services. These shades of opinion, however, are generally associated with the requirements of special or "tailored" services peculiar to the operations of individual operators and companies. Analyzing the economic significance of some of the present developments in the design and operation of sea-going bulk oil carriers, there are certain influencing factors upon which an agreement of opinions should obtain.

Amongst such influencing factors are those related to the gradual increases which have been made in the deadweight carrying capacity and sea service speed of tankers during the past two decades. The gradual improvement in the design of the hull structure, hull form and its appendages, propulsive equipment and hull engineering items, with resultant relatively large decreases in the weight thereof, has made it possible to obtain an attendant gradual increase in deadweight carrying capacity and in sea service speed. The increase in speed occasioned very close study of hull form and propulsion, and the resulting "fining" of tanker lines has permitted the present day tanker to maintain speed in heavy weather.

It is obvious that an increase in the sea service speed of a large tanker has a greater influence on the average speed of transportation of petroleum products, than a like increase in the speed of a smaller tanker in the same service. Constant efforts are being made to minimize the cost per cargo deadweight ton per mile for the transportation of the petroleum products carried and to obtain a maximum return on the capital invested in the vessel. Compatible with port facilities and ashore oil handling facilities involved, the average size of tankers as to deadweight capacity and cargo volumetric capacity has been gradually increased over the average size of tankers built ten years ago. In this connection it is of interest to note that the world average deadweight carrying capacity of tankers built in 1930, principally motorships, was about 12,300 tons and the average speed about 11¼ knots.

The present day tanker construction embodied in the Maritime Commission tanker building program, indicates an

* This paper was read October 18, 1944, at the American Merchant Marine Conference held in New York, it being included in the panel on marine aspect of the oil problem.



This photo, furnished through courtesy of "Ships Magazine," shows T2 tanker launching in July, 1944.

average of slightly more than 16,600 tons deadweight capacity per tanker and a speed of slightly over 14½ knots.

312 Tankers Delivered

As of September 30, 1944, the program of Maritime Commission tanker construction included contract groups comprised of 446 tankers contracted for and about 312 tankers delivered, of the types designated T2-SE-A1 and T2-SE-A2. Such types of tankers are rationalised commercial vessels having the same hull characteristics—symbolized by "T2," like form of single-screw steam turbine electric propulsion—symbolized by "SE," but different power of propulsion—symbolized by "A1" for installation with propulsion motor capable of developing about 6600 shaft horsepower at 93 revolutions per minute; and "A2" for installations capable of developing about 10,000 shaft horsepower at 106 revolutions per minute. Of the two types the contract groups embody 406 vessels of the "A1" symbolization and 40 vessels of the "A2."

The Maritime Commission's construction program has also included contract groups comprised of 15 tankers contracted for and 14 tankers delivered, of the type designated T3-S-A1, which in general is a geared steam turbine propulsion powered contemporary of the steam turbine-electric propulsion T2-SE-A1 tankers. In view of the preponderance of tankers constructed and delivered since the beginning of 1942, being of the Marcom T2-SE-A1 type, and by reason of the same hull form characteristics having been embodied in two other differently powered designs of privately constructed contemporary tankers, it is thought that a comparison of such designs is especially pertinent to the subject.

Comparison Given

The three designs embody the use of fluted bulkheads in cargo oil tanks, and are of the single deck poop-bridge-forecastle erections type, with twin longitudinal bulkheads in the cargo tank body, and bracketed longitudinal framing of shell and deck. While the T2-SE-A1 tankers are entirely of welded construction, the other two designs employed riveting in the seams of the side shell plating and upper deck plating—the butts were welded. The T2-SE-A1 tankers have no sheer of upper deck but are of increased moulded depth, resulting in practically the same summer freeboard draft as that which obtains for the other two designs having a parabolic sheer of upper deck. The details of the other features of: tank body disposition and volumetric capacity, location of cargo oil pump room, semi-bulbous bow, cruiser stern, are quite comparable in all three designs.

The propulsion power installations are, however, entirely different in the three designs—the T2-SE-A1 type have a 6000 shaft horsepower (normal) at 90 revolutions per minute steam turbine electric installation, while the other two designs each have a geared steam turbine installation, one design having 4000 shaft horsepower (normal) at 85 revolutions per minute, and the other design having 9000 shaft horsepower (normal) at 90 revolutions per minute. Under certain conditions of propulsion power operation, as presently authorized by the War Shipping Administration, the motor of T2-SE-A1 tankers may be operated at about 7600 shaft horsepower and 97 revolutions per minute. The average sea service speed and the corresponding "all-purpose fuel oil consumption" per twenty-four hours, for each of these comparable designs, should be: for the geared steam turbine vessels, 13 knots—203 barrels and 16.5 knots—415 barrels; and for the steam turbine electric vessels, 14¾ knots—311 barrels and 15.3 knots—348 barrels.

Further comparison of these three designs, as to their relative deadweight capacity and ratio of deadweight/displacement, at International Summer freeboard draft and with vessels devoid of any national defensing, is:

4000 shaft horsepower vessel—16725 tons and 0.767 ratio.

6000 shaft horsepower vessel, without upper deck, under deck supplementary girders, and modified after accommoda-

6000 shaft horse power vessel, with upper deck, under-deck supplementary girlers, and modified after accommodations—16610 tons and 0.759 ratio.

9000 shaft horsepower vessel—16585 tons and 0.759 ratio.

In the case of the geared steam turbine propulsion designs, the increase in power from 4000 shaft horsepower to 9000 shaft horsepower resulted in an increase in machinery weight of about 12½ percent and an increase in cost of about 10 percent of the construction cost of vessel. The increase in speed of about ½ knot for the T2-SE-A1 tanker is the result of relaxation of design rating and minor changes in the steam turbine unit.

Quantitative analysis of the effect of speed changes in these designs depends upon the evaluation of all items to meet the operating and cost structure peculiar to each operator it should, however, be possible to operate and maintain in operation such vessels at their higher speeds and, in doing so, reduce the "cost per cargo deadweight ton per mile" in the order of several percentum.

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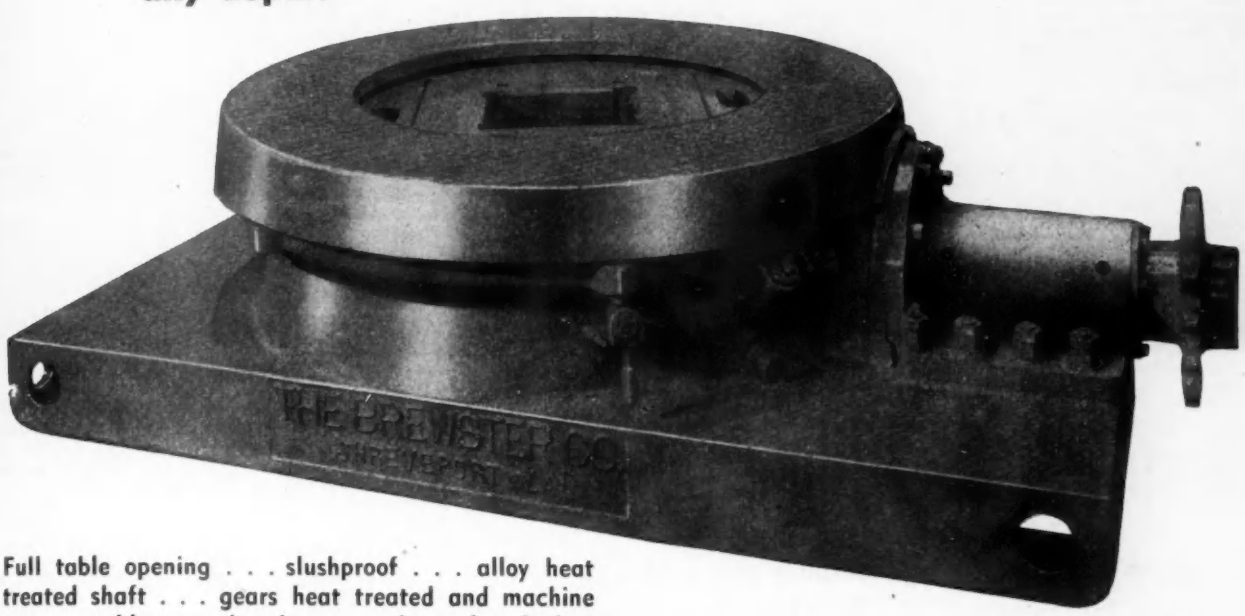
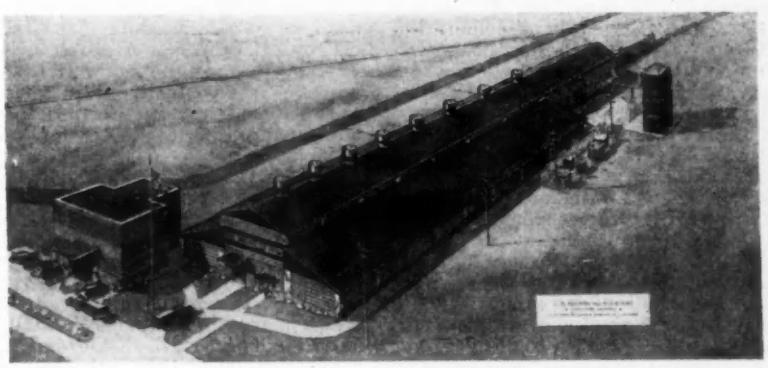
IMMEDIATE DELIVERY on the famous BREWSTER Oilbath Rotaries—the last word in equipment for drilling to any depth.



Full table opening . . . slushproof . . . alloy heat treated shaft . . . gears heat treated and machine cut . . . table gear shrunk on; can be replaced when worn . . . gears and bearings lubricated in separate reservoirs . . . ball bearing table; roller bearing pinion shaft . . . years ahead in design and performance.

Brewster is building now for your tomorrow—the addition of a truly modern machine shop housed in a fireproof structure 150' wide and 400' long on eight acres paved three sides—a 25-ton crane with a 60' span—railway facilities right through the plant. War material now; oil field equipment after the war—equipment better than anything dreamed of before Pearl Harbor.



We have been awarded the Army-Navy "E" three times for outstanding performance in the production of bomb cases, two sizes and types . . . loading chocks . . . cargo winches . . . lease-lend oil field equipment for Russia . . . anything the Army and Navy want that we can give them.

The BREWSTER Co., Inc.

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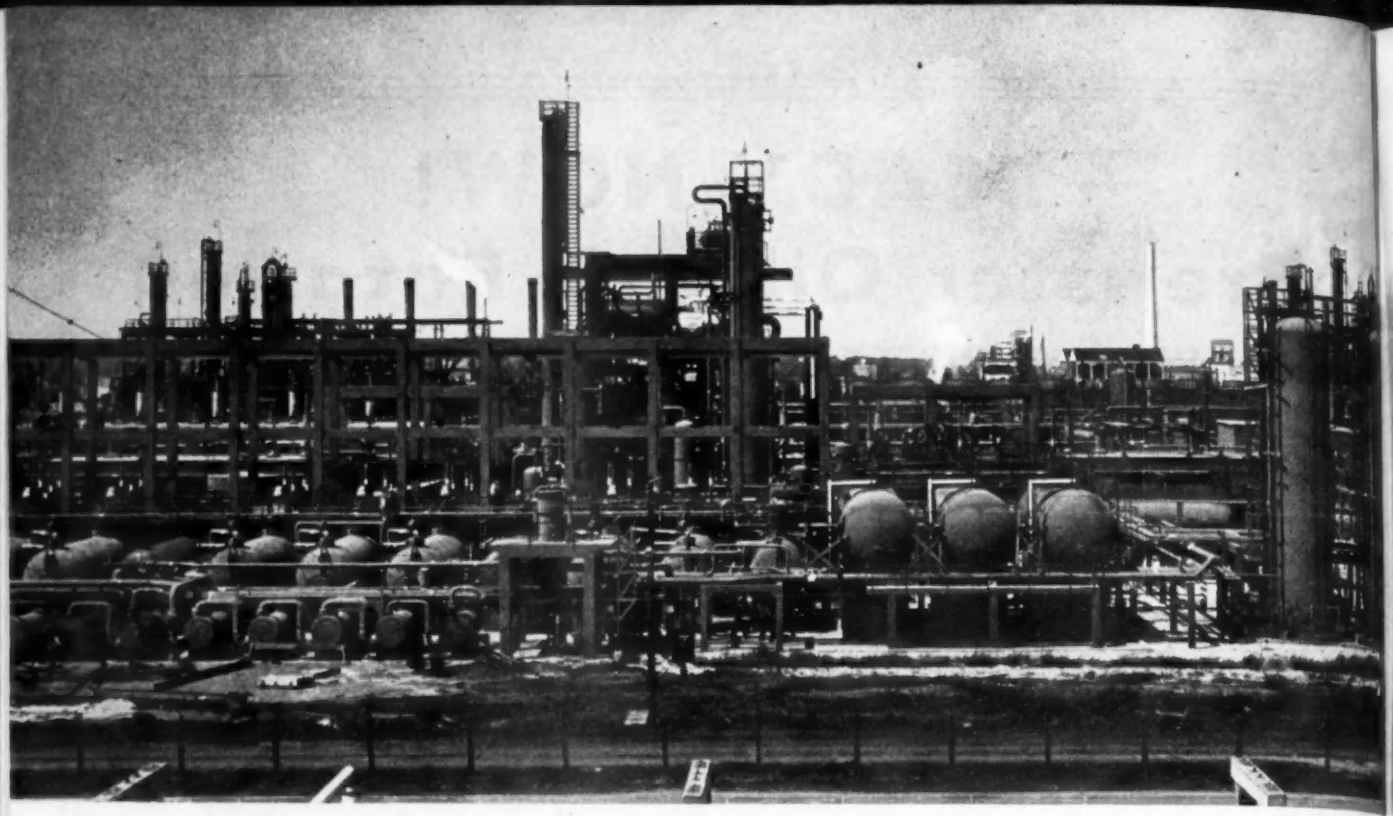

A section of the butadiene plant operated by Humble Oil & Refining Company at Baytown, Texas. The chief raw materials for this plant come from the company's refinery, adjoining this plant.

Billionth-Gallon Observance

Humble Oil & Refining Company plans December 14 party for milestone in 100-octane gasoline output, a feat unparalleled in petroleum industry history

PRODUCTION of one billion gallons of finished 100-octane aviation gasoline will be acknowledged in a celebration by Humble Oil & Refining Company, December 14, at the Baytown, Texas, refinery. This feat, said to be unparalleled in the petroleum industry, heads the list of many contributions by the Humble Companies and their 14,000 employes to the war effort. The war production record climaxes a quarter of century of research, planning and development by the company.

In addition to 100-octane, Humble refineries have also supplied large quantities of other aviation and military gasolines, aviation engine and heavy duty lubricating oils, Navy special fuel oil, and other essential products. They are supplying about one sixth of the materials being manufactured from petroleum for the synthetic rubber program.

Company's Part

One fourth of the additional crude oil needed for war is being furnished by Humble, and the company is producing more crude than any other company in the United States. One barrel out of every 12 in our domestic supply is currently being produced by Humble.

One in every seven barrels of the nation's crude supply is being transported through Humble Pipe Line Company's lines with a daily average load of 700,000 barrels.

Highlight of the December 14 celebration will be formal presentation of the one billionth gallon of 100-octane gasoline to a high-ranking military official by H. C. Wiess, Humble president. In addition to military officials, there will be in attendance also state and national government officials and leaders in industry.

A number of special exhibits of war equipment will show the dependence of mobile armies on petroleum.

Additional exhibits and motion pictures will portray the Humble Company's operations and will serve to give a background for visits to the refinery. Special tours will be conducted through the refinery and adjacent war plants throughout the week of December 14.

A bronze medal commemorating the event will be presented to the 14,000 employes, and more than 3000 in the armed forces, in a special book which contains a message from the company's management expressing appreciation for the contribution each employe has made toward establishment of war production records. Another booklet, telling in pictures and story the accomplishments of the several departments of the companies, will be mailed to each employe.

At Baytown there are four government projects that have been designed and built by Humble, and are being operated by Humble for the government. The Baytown Ordnance Works is engaged in making toluene. The hydrogenation unit, recently completed at a cost of $4,250,000, contributes to the manufacture of 100-octane aviation gasoline. The Baytown butadiene plant provides raw material for Buna-S rubber made at the adjacent Copolymer plant. The Baytown butyl rubber plant produces finished rubber of the butyl type.

Approximately 6000 men and women are employed to operate these plants continuously to supply products needed for military and essential civilian uses.

Toluene is the final "T" in "TNT" or nitro-glycerine. It is produced at the Baytown Ordnance Works from petroleum by chemical synthesis. At least one out of every two bombs used by the United Nations since Pearl Harbor has contained toluene from Baytown.

Butadiene is the basic ingredient for synthetic rubber of the Buna-S type, which represents 85 percent of the government synthetic rubber program. Butadiene comes from petroleum in the cracking process. The Baytown butadiene plant has a rated capacity of 30,000 tons per year, has produced about 32,500 tons to date, sufficient for nearly 45,000 tons of Buna-S rubber.

Raw material for butyl rubber is a butane-butylene mixture supplied by the Baytown refinery. The Baytown butyl rubber plant has a rated capacity of 30,000 tons per year.

Nomads to Elect

The Los Angeles Chapter of Nomads have named a nominating commitee to select officers for 1945. Committeemen are Bill Bettis, Hi Cassidy, Elmer Decker and Ted Sutter, members; Webb Wilson, Earl Daniels, Al Farrow and Custer Morrow, alternates.

Planning MUST PRECEDE POST-WAR PRODUCTION

The Oil Industry will have no armistice from the battle of production when peace comes, for petroleum will play an increasingly important role in our post-war economy.

To meet present problems and to prepare for the future requires planning—planning in which an intelligent and experienced banking service can be helpful.

The Oil Bank of America welcomes the opportunity of cooperating with oil producers and those who serve the oil industry by making available the kind of banking service based on experience and a genuine desire to serve that can help you in your planning.

NATIONAL BANK OF TULSA

The Oil Bank of America

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Section of Tennessee Gas and Transmission Company 24-inch line showing a number of cold bends.

Modern Natural Gas Transmission Design

By LORING E. HECKMAN

Consultant, Natural Gas-Natural Gasoline Division,
Petroleum Administration for War

OVER 83 percent of the known available natural gas reserves in the United States are concentrated in an area including Louisiana and Texas and seven counties in Western Kansas and Oklahoma. Long pipe lines transport gas produced in this area to such distant centers as Denver, Minneapolis, St. Paul, Kansas City, St. Louis, Chicago, Detroit, Memphis, Birmingham and Atlanta. The growth of natural-gas consumption in most of these centers is taxing the capacity of existing lines to the limit, with the result that further looping of these lines is expected in the near future.

A large portion of the natural-gas consumption of areas such as the Appalachian area, the Eastern Kansas-Oklahoma area, and California has been supplied by local production. However, as a result of very high demands upon these local sources during the last four years, there has been a rapid decline in reserves and deliverability, and there is now a need for new transmission lines to carry gas from concentrated supply areas to these established markets to compensate for declining local production.

In view of the necessity for additional natural-gas transmission lines in the near future, the practice in design and construction of the lines which have been built recently, or are in the process of construction, should be examined to emphasize those factors which tend to minimize the cost of transmission.

In the design of a gas transmission line, selection of the size of pipe, the number of compressor stations and the ratio of compression are determined by equations of gas flow and factors of cost along established principles which have been amply discussed in the literature of the gas industry. It is in the selection of materials and of operating pressure that modern practice indicates trends to lower cost.

Certain phases of gas-transmission-line practice have undergone a change as a result of improvements in pipe welding, in pipe manufacture, in pipe coating and cathodic protection methods, in high-pressure valve manufacture, in engine-compressor units and in the technology with reference to super-compressibility and pipe-line-friction factors. While some of the modern types of material have been available for a considerable time, it has taken the test of time and use to prove the material and its application. Take the case of high-grade electric weld and seamless pipe. This material has been available since about 1931. Yet, until recently, it was not thought practical to employ pressures which would stress the pipe to 70 percent of yield strength, which is equivalent to a safety factor of 1.4 to 1.5. The apparent delay in the full use of new methods and materials is due largely to the fact that 1931 marked completion of a great expansion of natural-gas lines and no large transmission lines have been built until recently, with the exception of the looping programs of existing lines. In some cases, thinner-walled pipe was used than had been installed on the lines which were being looped, but the operating pressures were limited by the original lines.

The tendency at the present time is to employ working pressures of from 700 to 800 pounds on long lines and higher

We salute the world leadership achieved by Texas' oil industry and express faith and confidence in its continuation.

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Gulf Building Houston

"The Bank of Courtesy"

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

pressures on short lines where field compression is not necessary, to determine safety factors on the basis of the yield strength of the steel rather than the ultimate tensile strength, to install angle type engine-compressor units, to dehydrate gas before it enters the line and to establish a high sustained load.

In 1891, two parallel 8-inch gas lines were constructed into Chicago from Greenstown, a distance of 120 miles, using wrought iron pipe with screw joints. The maximum operating pressure was 525 pounds,[1] which was unusual at that time. In 1909, Cincinnati Gas Transportation Company constructed a 20-inch "soft" steel line about 126 miles long from Kenova, West Virginia, to Cincinnati, Ohio, using couplings. This line had a maximum operating pressure of 325 pounds. Many other lines of similar length and capacity were constructed up to 1926, most all of them being limited to about 300 pounds maximum working pressure, some using wrought iron pipe, but many with lap-welded steel pipe of about 45,000 pounds tensile strength.

The construction of Interstate Natural Gas Company's 170-mile, 22-inch steel pipe line from Monroe to Baton Rouge, Louisiana, in 1926, and its 90-mile extension of 18-

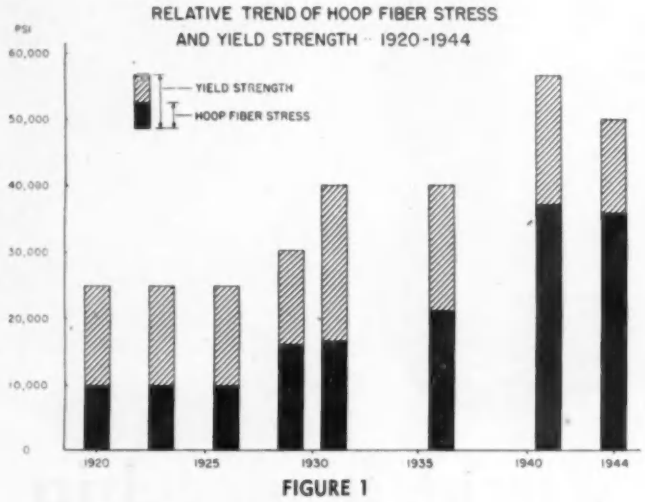

FIGURE 1

inch in 1927 marked the start of the expansion of long gas lines which took place up until the end of 1931. Pacific Gas & Electric Company's 16- and 22-inch line from Buttonwillow to Milpitas, California, completed in 1929, was the first large gas line of all-welded construction. The Standard Oil Pacific Gas transmission line from Buttonwillow to Oakland, California, was the first major long natural gas line to use 26-inch pipe.

Table 1 shows 16 natural-gas transmission lines constructed from 1926 to date. While some 40 transmission line projects have been considered in reference to this subject, those listed have been chosen in general because they are major projects or are significant of the trend of transmission-line practice. The transmission lines of Cities Service Gas Company from Pampa to Wichita, Colorado Interstate Gas Company from Texas to Denver, the Columbia Gas & Electric Corporation from Boldman, Kentucky, to Coatesville, Pennsylvania, Montana Power Company from Cut Bank to Anaconda and Butte, Montana, and Southern Natural Gas Company from Monroe, Louisiana, to Atlanta, Georgia, have been omitted from the table because of lack of full information on the wall thickness of the pipe and the characteristics of the steel. Several of these lines undoubtedly mark the most difficult pipe-line work undertaken and they are distinct achievements in design and construction. These lines are from 200 to 450 miles long and consist mostly of 20-inch and 22-inch pipe with maximum working pressures which do not exceed 500 pounds, and safety factors of 4 to 5 on the ultimate tensile strength. Thus it can be seen that these lines have similar characteristics to those listed on the table.

Working Pressure

The maximum working pressure cannot actually be considered as independent of the safety factor. With a given line size, pipe-wall thickness and yield strength, the safety factor decreases with the increase in maximum working pressure. The principal point to be emphasized is that operators now have sufficient confidence in material standards and construction work to be willing to operate lines at maximum working pressures which will stress the steel in the pipe to about 70 percent of the yield strength, or in other words, to use a safety factor of 1.4 to 1.5.

The conditions which influence the determination of the maximum working pressure should be considered. The selection of the maximum working pressure employed in a transmission line is largely dependent upon the engineering judgment of those responsible for the operation and is a question of how much reliability should be placed on materials and construction methods.

The maximum working pressure on most major transmission lines constructed from 1926 to 1931 was limited to about 500 pounds as shown in Table 1. The outstanding exception to this was the 24-inch line of Natural Gas Pipe Line Company of America from the Panhandle field in Texas to Chicago, which was operated at 600 pounds initially and now operates at a maximum pressure of 712 pounds.

During this period, experience gained in the manufacture of large electric-weld and seamless pipe and in the construction and operation of hundreds of miles of gas lines under widely varying conditions, brought about improvements in design, in construction and in testing procedure. Lap-weld pipe began to be displaced with electric weld and seamless pipe. The use of couplings for all pipe joints was being replaced by composite weld and coupled lines and in some cases by all-welded lines. The technique of acetylene welding was introduced and improved. Similarly, arc welding was introduced and improved. Valves of suitable sizes which have been limited to about 500 pounds working pressure were modified and the working pressures increased. Leakage which was a major problem on screw lines of an earlier day was reduced to lesser importance in coupled lines by the use of improved coupling gaskets and was largely eliminated in all-welded lines.

As a result of this development, a change in construction practice began to be evident as illustrated by the 800- and 650-pound working pressures of El Paso Natural Gas Com-

TABLE 1

Natural Gas Transmission Line Characteristics 1926 to 1944

COMPANY	Date	Pipe Diameter—Inches	Length of Line—Miles	Pipe Wall Thickness—Inch	Max. Working Pressure, psi	Safety Factor Ultimate
Interstate Natural Gas	1926	22	172	3/16	350	4 to 5
Memphis Natural Gas	1928	18	210	1/4, 11/32	400	4 to 5
Pacific Gas & Electric	1929	16, 20, 22	297	1/4, 1/4, 9/32	400	4 to 5
Mississippi River Fuel	1929	22	431	1/4, 11/32, 3/8	400	4 to 5
*Standard Oil—Pacific Gas	1930	20 to 26	198	3/8, 1/4	400	4 to 5
Panhandle Eastern Pipe Line	1931	20, 22, 24	860	1/4, 11/32	500	4 to 5
Northern Natural Gas	1931	16 to 26	820	.....	400–450	4 to 5†
Natural Gas Pipe Line	1931	24	1000	1/4, 11/32	600‡	3.0
Hope Natural Gas	1936	12 3/4	93	1/4, 3/8	1300	3 Yield Point
Northern Natural Gas	1939	16	243	1/4	600	2.2
Natural Gas Pipe Line	1941	26	400	1/4	712	1.5
Southern Natural Gas	1942	14	120	5/16	1200	1.8
Oklahoma Natural Gas	1942	12 3/4	96	.259, 5/16, 7/16	1000	2.2
New York State Natural Gas	1944	12 3/4	145	5/16, 7/16	1000	2.2
Tennessee Gas & Transmission	1944	24	1200	1/4, 3/8	750	1.4
Cities Service Trans. & Chem.	1944	26	240	1/4	760	1.4

* Now an oil line. † The safety factor of several sections is not known. ‡ "Transportation of Natural Gas from Texas to Chicago". W. Soc. of E. J. 40:54-58 Ap '35. ° Based on an assumed tensile strength of 80,000 per square inch and 4/5-inch pipe.

The safety factors listed have been calculated on Barlow's formula using the pipe-wall thickness for the section or sections having the maximum working pressures. The figures 4 to 5 have been used because available data is not sufficiently accurate to warrant a closer figure. The company names listed are the present owners of the lines and not necessarily the original builders.

WORLD'S OIL NEEDS IS A *two-fisted job*

AND to pump this oil it takes a "Two-Fisted" Pumping Unit to stand the strain of constant operation, exposed through the years to every climate and condition in the world.

Back of the product there must be a "Two-Fisted" manufacturing plant operated by "Two-Fisted" men, rich in experience, exacting in detail, careful in selection of materials.

LUFKIN Pumping Units have stood every test for long life, low maintenance cost, carefree operation, for more than 20 years. Manufactured from the ground up in our tremendously enlarged and modernized plant, under the constant and careful supervision of experts.

Make your next unit a "LUFKIN" Unit—it pays to be sure.

LUFKIN FOUNDRY AND MACHINE CO.
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pany's extensions to Bisbee and Douglas and to Phoenix, constructed in 1931 and 1933, and the Zionsville to Detroit extension of Panhandle Eastern Pipe Line in 1936 having a 600-pound working pressure. In 1936, Hope Natural Gas Company completed a 12¾-inch line 93 miles long in West Virginia, from Cornwall Compressor Station to Hastings Station, designed to operate at 1300 pounds. The use of such a high working pressure is a land mark.

In 1941, United Gas Pipe Line Company built a 200-mile line from Lirette, Louisiana, to Mobile, Alabama, with a maximum working pressure of 1000 pounds,[2] since high-pressure gas was available at this field.

In 1942, Southern Natural Gas Company and Oklahoma Natural Gas Company each built solid welded lines from high-pressure fields with 1200 and 1000 pounds working pressure, respectively. Southern Counties Gas Company is building a line in California between LaGoleta storage field and Los Angeles, of which 36 miles will have a maximum working pressure of 1000 pounds. These lines illustrate that working pressures of 1000 to 1200 pounds are feasible with the present method of construction, and practical where such pressures are available without compression. This is particularly significant in relation to the 22 trillion cubic foot reserve[3] of the condensate fields located in Texas and Louisiana, where the rock pressure is very high. While the pressures at which this gas will be available to pipe lines will vary and cannot be stated exactly, pressures in excess of 1000 pounds will be generally available.

Selecting Working Pressure

Selection of the maximum working pressure of a transmission line is partially dependent upon the field pressure and the length of the line. If sufficiently high field pressure exists to transmit a suitable volume of gas from a field through a pipe line to the market, without recompression, then this field pressure may well be the most economic maximum working pressure. If, however, the terminal point of the line is many hundreds of miles from the field and numerous recompressions are necessary, then it may not be economically sound to build the entire line for a high maximum working pressure.

The trend of modern practice is illustrated by three major transmission lines, one built, one building and one which was planned but not built, designed for working pressures of from 700 to 800 pounds. These are Cities Service Transmission and Chemical Company's 26-inch line from Hugoton field, which was designed to operate at 760 pounds working pressure; Tennessee Gas & Transmission Company's 24-inch line from Texas to West Virginia with 750 pounds maximum working pressures, and the line which Hope Natural Gas Company had contemplated building from Hugoton with an operating pressure of 770 pounds. These lines indicate the present practice of long natural gas transmission to use large diameter, thin-walled, high strength pipe with a maximum working pressure of from 700 to 800 pounds.

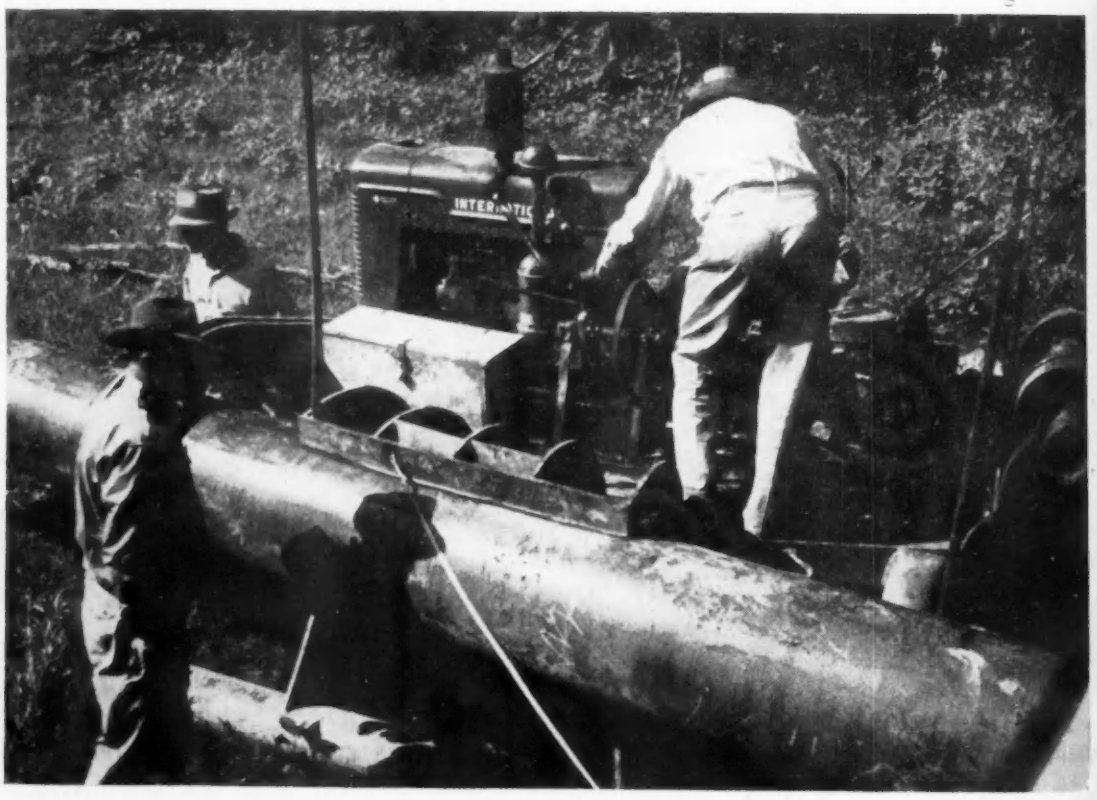
Table 1 shows that up to 1931, most pipe lines were designed with a safety factor of from 4 to 5 based upon the ultimate tensile strength of the pipe material. Up to about 1927, only butt-weld and lap-weld pipe were available. The lap-welded pipe had a tensile strength of about 45,000 pounds, with lap-weld joint efficiency of about 92 percent. The first electric-weld pipe was made in 1927. To meet this competition, other pipe companies undertook the manufacture of seamless pipe.

At the same time, another development was taking place in the field. In 1927, acetylene welding of joints was coming more into use. During 1929, arc welding was used extensively on gas transmission lines. In 1930, the shielded-arc electrode was brought into use, with the result that the welds were more ductile, hence safer. Most lines were still being built by welding several sections of pipe and then jointing these longer sections with couplings. This resulted in a flexible line able to provide for expansion and contraction caused by temperature changes.

Up to 1931, long gas lines of large pipe had been a new undertaking. There was no adequate background of experience in laying the pipe, in welding, in the use of couplings and in testing the lines. Also, mill standards were not as high as they later became. A certain tendency still existed to provide extra thickness in pipe walls for corrosion. Taken all together, the art was new and so it was considered good engineering judgment to provide a safety factor of 4 to 5 on the ultimate tensile strength of the steel. Actually, this was a safety factor of 2.5 to 3.0 on the yield strength of the steel.

In 1936, Hope Natural Gas Company built an all-welded line designed with a safety factor of 3 on ultimate tensile strength. In 1939, Northern Natural Gas Company extended its system 243 miles with 16-inch pipe with about the same safety factor. However, this line was designed for a safety factor of 2.2 on yield strength, and is believed to be one of the first natural gas transmission lines whose safety factor was based on the yield strength.

As illustrated in Table 1, gas transmission lines constructed from this time on were designed with a safety factor based upon the yield strength. Uncertainty about welding, non-uniformity of thickness of the pipe and erratic physical characteristics of steel in the pipe had largely disappeared. The 26-inch line of Cities Service Transportation & Chemical Company was designed with a safety factor of



Using new type cold bending machine on 24-inch line of Tennessee Gas and Transmission Company.

A Story that hasn't been told

AN AMERICAN WAR PRODUCTION RECORD THAT DESERVES TELLING . . .

On December 14, at 3:00 o'clock in the afternoon, the men and women of Humble Oil & Refining Company will pause in their work to commemorate, in appropriate ceremony, a feat unparalleled in the petroleum industry: The production of ONE BILLION GALLONS of finished 100-octane aviation gasoline at the Baytown refinery.

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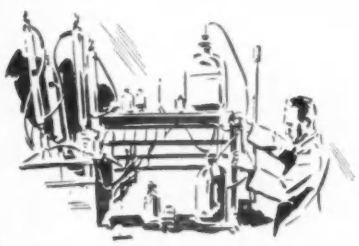
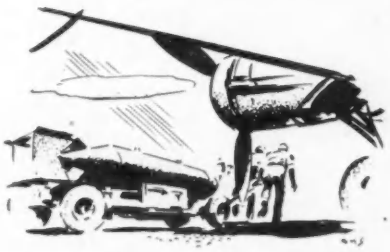


Humble research and development, in progress for many years before Pearl Harbor, made possible these accomplishments and contributed greatly to the total production of toluene, and the tremendous quantities of finished 100-octane aviation gasoline required by our Armed Forces.



Baytown Ordnance Works, first synthetic toluene plant in the world, has supplied toluene for at least one out of every two bombs used by the United Nations since Pearl Harbor. For this production feat, Baytown Ordnance Works has five times been awarded the Army-Navy "E".

Baytown Refinery has made one billion gallons of finished 100-octane aviation gasoline —more than has been produced by any other plant in the world. The world's first commercial alkylation plant was built at Baytown in 1938. The alkylation process is the very backbone of 100-octane aviation gasoline production by the entire petroleum industry.

Humble Oil & Refining Company is the nation's largest producer of crude oil, and is currently supplying about one-fourth of the increased production required for war, as measured by the gain since 1941.

Through the facilities of Humble Pipe Line Company, there is being transported more oil than is being carried by any other system in the country. Nearly 700,000 barrels move daily through Humble pipe lines—one-seventh of all the oil production in the United States.

United in a great singleness of purpose, 14,000 Humble men and women are devoting themselves to the task of providing vital petroleum products for war, looking to the day when their 3,000 fellow employees and all their comrades in arms will return.

OPEN HOUSE AT BAYTOWN REFINERY, DECEMBER 14-17

So that one of America's great war plants may be seen in action, Baytown Refinery is holding open house from Thursday, December 14, through Sunday, December 17. The story of the refinery at war will be told by dramatic exhibits of petroleum war products and a great Army and Navy show of war machines and materials. Specially conducted tours will take Humble's friends and neighbors into the heart of the refinery itself.

HUMBLE OIL & REFINING COMPANY

HOUSTON, TEXAS

HUMBLE

1.4. The 24-inch Tennessee Gas & Transmission line, which is now being built, has a safety factor of 1.4. The 22-inch line, which Hope Natural Gas Company had proposed to construct in 1944, was designed on a safety factor of 1.4.

Use of safety factors of 1.4 to 1.5 on the yield strength shows complete confidence in the welding methods, in the pipe strength and uniformity and in construction methods. This practice has been made possible because the procedure of carefully inspecting and testing materials and workmanship of every mile of line has become a part of modern construction methods. The pipe manufacturers' guarantee of a specified yield strength is as reliable as their inspection and testing procedure. Sampling and testing of each welder's work before permitting him to weld joints on a pipe line helps to assure uniform welding. The internal pressure test of completed sections of the line at pressures reasonably above the maximum working pressure and below the yield strength, eliminates faulty materials and workmanship. These testing procedures make it possible to design on the basis of a maximum working pressure equivalent to about 70 percent of yield strength.

Figure 1 shows the relative trend of hoop fiber stress and yield strength on typical gas lines constructed from 1920 to date. It illustrates that the yield strength has risen from 25,000 pounds per square inch in 1920-1928 to 50,000-55,000 pounds. This is an increase of about 120 percent. During the same period, the fiber stress increased from 1,000 to 36,000 pounds, or about 260 percent. While only a few examples have been illustrated on this chart, they are representative of the trend in fiber stress as compared with the trend in yield strength. This shows that transmission line practices have advanced to a point where much more efficient use is now being made of the strength of the pipe.

When welding of gas lines first begun, there was considerable objection to a solidly welded line without couplings or joints to provide for expansion. It was believed that longitudinal stresses resulting from the expansion and contraction due to temperature variation would cause the pipe to fail. The first large all-welded lines were constructed in California and in Texas[4] in locations where the temperature change was small. However, construction of Hope Natural Gas Company's line in 1936 with solidly welded construction helped dispell this fear and all-welded construction has now become accepted practice.

Compressors

Until about 1940, horizontal slow-speed gas engines were used almost universally as prime movers in gas booster stations on long transmission lines. The simplicity and reliability of the horizontal unit had proved itself in over 40 years of use. It warranted the confidence placed in it by pipe-line men. These slow-moving engines do not fail easily or quickly, and if carefully checked and repaired, their maintenance cost is reasonable. However, in the last four years, many medium speed multi-cylinder angle-type engine-compressor units have been installed for this service.

When the new medium-speed multi-cylinder angle-type engine-compressor units were brought out in 1937, the gas industry awaited proof of their dependability and reasonable maintenance cost before adopting their general use on long lines. However, many of these units were installed in refineries, gasoline plants and cycling plants. Since 1942, the gas companies have found it difficult to secure anything but an angle unit, and so this type was installed in new booster stations or station additions. Now many of these units have been pumping three years or longer, so there has been ample opportunity to establish their reliability and reasonable maintenance cost.

Most of the angle-type units have a stroke of about 14 inches. On the basis of 300 revolutions per minute, the average piston speed is about 700 feet per minute. The horizontal units most commonly in use on long transmission lines have a 36-inch stroke and a speed of 125 revolutions per minute, which indicates a piston speed of 750 feet per minute. So the cylinder and piston wear should be about the same for both types. The ignition systems of both slow- and medium-speed units are very similar, both having taken on the characteristics of an automobile-engine ignition.

Capacity Factor

The term "capacity factor" as applied to gas transmission lines is the ratio of the average load to the capacity. Many companies having closely interconnected networks of lines cannot determine the capacity of their systems and so they do not know the capacity factor. The various sections of such systems have been built over a period of years with different working pressures, lengths and sizes of pipe. As a result of changes in field pressure, and the growth or decline of loads, operating conditions have changed to the extent that the original design capacity has little meaning in the system network. In this type of system, the criterion of operation in lieu of a capacity factor is the load factor, or the ratio of the average load to the maximum load.

It is not economically feasible to construct a long line unless a high capacity factor can be assured, because of the large investment required and the high fixed charges resulting. There are several ways of establishing a high capacity factor, including the sale of gas on an off-peak basis and the use of underground storage reservoirs. When a new line is contemplated, contracts offered to distributing companies and to industrial concerns can be arranged to provide lower rates for gas sold during off-peak periods and thus offer an incentive for off-peak load. The large industries will purchase gas on this basis, provided the gas rate will compete favorably with other available fuel and will allow a margin for the cost of installation of necessary standby fuel facilities.

There has been an increasing use of old gas fields as storage reservoirs. Gas is injected into these fields during periods of low demand and taken out during periods of high demand, thus cushioning the effect of variations in demand. It is becoming the practice to use such fields when available to help develop the high capacity factor necessary for new pipe lines.

The capacity factor of most long gas lines constructed in the period from 1926-1931 was 60 to 70 percent at the time the lines were built. Now, most new lines have a capacity factor of about 80 percent.

The new lines of Cities Service Transportation and Chemical Company and Tennessee Gas and Transmission Company have been planned on the basis of high capacity factors. The large base load of the Cities Service system will provide a high sustained load for the Hugoton line. The large storage capacity of the Appalachian area will help to establish a high capacity factor on the Tennessee Gas and Transmission line. The existing partially depleted fields of this area will be called upon for much of the peak demand. Other new lines from concentrated production areas to the large markets are expected to have high capacity factors because of the necessity of carrying a great volume of gas long distances, economically.

The idea has recently been advanced that natural gas should be conserved for "higher" uses, such as domestic consumption, and that it is not to the best interests of such consumers that gas be sold at low-offpeak rates for boiler fuel. The problem of the transmission of natural gas from distant fields is largely a question of cost. As has been stated, it is not economically feasible to construct new lines unless they have a high capacity factor. It would be perfectly sound to build a line for a low capacity factor if consumers could be expected to pay a sufficiently high rate. Under prevailing gas rates and the present field cost of gas, it is not practical to build new lines with much less than 80 percent capacity factor. As the load factor of most gas distribution centers, which might be terminal points of long transmission lines, is much lower than 80 percent, provision must be made to complement this load. When the sale of gas on an off-peak basis will help to establish the capacity factor at the point where the construction of a new line is feasible, such sale is to the interest of the domestic consumer because it is only by the construction of such a line that distant sources of gas become available.

Conclusion

The art of transmitting the large volumes of natural gas has changed from an initial stage in the period from 1926-31 during which suitable high-strength pipe was being developed and methods of construction were changing, to the present period in which improved materials are available, workmanship is of high caliber and the maximum use is being made of pipe strength. The trends to minimum cost during this time are characterized by the use of maximum working pressures which will stress pipe to about 70 percent of the yield strength, by the installation of medium-speed angle-type compressing units and by capacity factors of at least 80 percent.

Acknowledgement

I thank Oklahoma Natural Gas Company and Tennessee Gas and Transmission Company for the use of the pictures exhibited, and Cities Service Transportation and Chemical Company and the Tennessee Gas and Transmission Company for valuable information furnished.

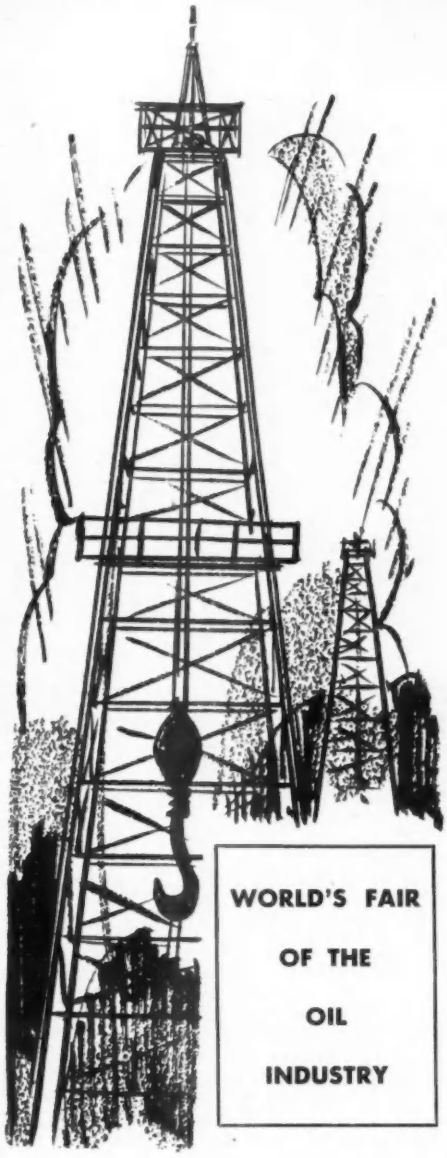
[1] "The Long Distance Transmission of Gas," H. C. Cooper, presented at World Fuel Conference held in London, England, 1928.

[2] "Constructing the Lirette-Mobile Line," W. B. Poor, Mech. Eng. 65:9-13Ja-'43.

[3] "Natural Gas Cycling and Its Significance to the Natural Gas Industry," Robt. W. Ducker and Frank H. Dotterweich, presented to the Natural Gas Section, American Gas Association, French Lick, Indiana, May 11, 1944.

[4] "Longest Welded Pipe Line," Gas Age Record 58:844 Dec. 11, 1926.

GREETINGS TO THE WORLD OIL INDUSTRY!



THE International Petroleum Exposition, established in 1923, extends greetings to the officials and technical experts of the governments and oil companies throughout the world.

AFTER twenty-one years of unselfish service to the Petroleum Industry and with a consistent program designed to advance the methods, processes and equipment of the industry, and promote friendship and mutual confidence through the free and unrestricted exchange of fellowship, experience and scientific development, the officers and directors of the Exposition hope for an early peace and pledge their thought and effort to the best interests of industrial progress and human happiness everywhere.

When another International Petroleum Exposition is held, it will be in Tulsa, Oklahoma.

Sincerely,

INTERNATIONAL PETROLEUM EXPOSITION

W. G. Skelly, *President* **Wm. B. Way, *General Manager***

TULSA, OKLAHOMA, U.S.A.

INTERNATIONAL PETROLEUM EXPOSITION

Ickes' Views on Oil Pact Differ With Those of Industry

Says agreement would promote efficient and adequate production without limiting markets or cartelization

By WARREN L. BAKER, Editor

HAROLD L. ICKES, the Secretary of the Interior as well as Petroleum Administrator for War, who was one of the government's cabinet members participating in negotiations that led to the Anglo-American oil agreement, has presented the first interpretation of the agreement to come from an official member of the government's administrative branch. He declares there "will be no restriction of markets, no cartelization indulged in by the two countries, but rather the promotion of efficient production in ample amounts to supply world requirements."

Furthermore, Ickes promises that the United States henceforth will have "the same freedom to explore for and develop oil in lands under British control as Great Britain has always had in land in American territory."

These views are completely contrary to the meaning seen by virtually every oil man. In view of all the criticism that has been directed at the agreement, the government's interpretation of its meaning undoubtedly was prepared deliberately with great care in choice of language.

Ickes' Interpretation

Writing in the December 2 issue of *Collier's*, Ickes says:

"In effect the agreement states that both Great Britain and the United States agree to recognize the rights and interests of the other as to oil in all parts of the world. No restrictions will be attempted by either country upon the orderly development of oil fields in foreign lands in which the nationals of either country have an interest. The British undertake to remove restrictions incompatible with the principle of equal opportunity and to use their influence to remove restrictive measures such as the so-called 'red line' agreements which limit the right to search for oil within what roughly constituted the boundaries of the old Ottoman Empire. The United States would have the same freedom to explore for and develop oil in lands under British control as Great Britain has always had in land in American territory.

"In short, the agreement contemplates there will be equality of opportunity as to the exploration for and the refining and marketing of oil for either country. Neither will try to seek an undue advantage at the expense of the other. The theme of the agreement was the principle of orderly production and distribution of oil with due regard for conservation so that there might be plenty of cheap oil for all of the countries of the world that desire oil. Special treatment, of course, must be accorded Germany and Japan.

International Commission

"Perhaps the most important part of the agreement is the provision to set up an international commission composed of four Americans and four Britishers, and that later, it is hoped will embrace representatives of all other friendly nations, both those that produce oil and those that only consume it. By its recommendations and leadership, it should bring about action in accord with the high principles of the basic agreement. There will be no restriction of markets, no cartelization indulged in by the two countries, but rather the promotion of efficient production in ample amounts to supply world requirements."

Ickes is in a better position to know the "inside" meaning of the agreement than almost anyone else. His interpretation of its meaning in a light absolutely contrary to the views of virtually every oil man is highly interesting. However, its great variance with the opinions of others is further proof of the charge that the document's language is so vague as to make any interpretation of its meaning possible, and also is further evidence of why oil men have declared that its vagueness means the agreement is as innocuous or as vicious as its administrators may desire to make it at anytime—now, or in the future.

On this point these words from Ickes article are significant: "Of course, the real test of the commission will lie in its personnel. If both countries appoint men of character and prestige, the working out of the agreement will start under auspices that can hardly fail." In the next sentence, Ickes asks it be remembered that "it is proposed to extend this plan to include representatives of other countries interested in oil, both as producers and consumers. So we may look forward," he continues, "to the formation, in due course, of a multilateral oil commission to take the place of the bilateral one provided for in the agreement."

An issue of great importance is whether the international commission, the establishment of which Ickes calls the most important part of the agreement is to have compulsory or only persuasive authority. It is noteworthy that Ickes does not express his views on this phase, merely limiting himself to these words: "By its recommendations and leadership, it should bring about action in accordance with the high principles of the basic agreement." The question of what kind of action—purely consultative and advisory, or compulsion by law—the commission will take was not answered. This is a significant omission.

An American Idea

Ickes' article also indicates the Anglo-American oil agreement was an idea promoted strictly within the circles of the United States government, and that the British were so reluctant to enter into it that it took some urging from the United States. These are conditions which are intimated to have existed, with these words:

"Because of the potentially enormous amounts of oil involved, it was obvious that a harmonious pattern to develop the area (the Middle East) must be worked out if possible serious disputes were to be avoided. Suggestions had been to the British that it was for their interest as well as for our own to get together in the same room and talk as friends and good neighbors about this important question of oil. But time continued to drag along to the precipice of impatience."

On this phase, Ickes points out that the technical "conferences proceeded quickly and harmoniously. They soon had arrived at a statement of principles by unanimous agreement. Their plan was to return to London as quickly as possible, lay the conclusions of the joint technical group before the war cabinet. Perhaps within a week or two Great Britain would appoint a cabinet delegation which would proceed to Washington to conclude the discussions.

"But the cabinet delegation was not appoinnted within a week, or within two weeks. Several weeks elapsed and anxiety was felt on this side that some serious hitch had occurred which would break off abruptly what had started out apparently as a most harmonious undertaking . . .

"But what was the matter in London? Finally, on July 12, after a number of polite inquiries and some diplomatic suggestions, the British government announced the appointment of its cabinet delegation headed by Lord Beaverbrook."

Revives Arabian Pipe Line

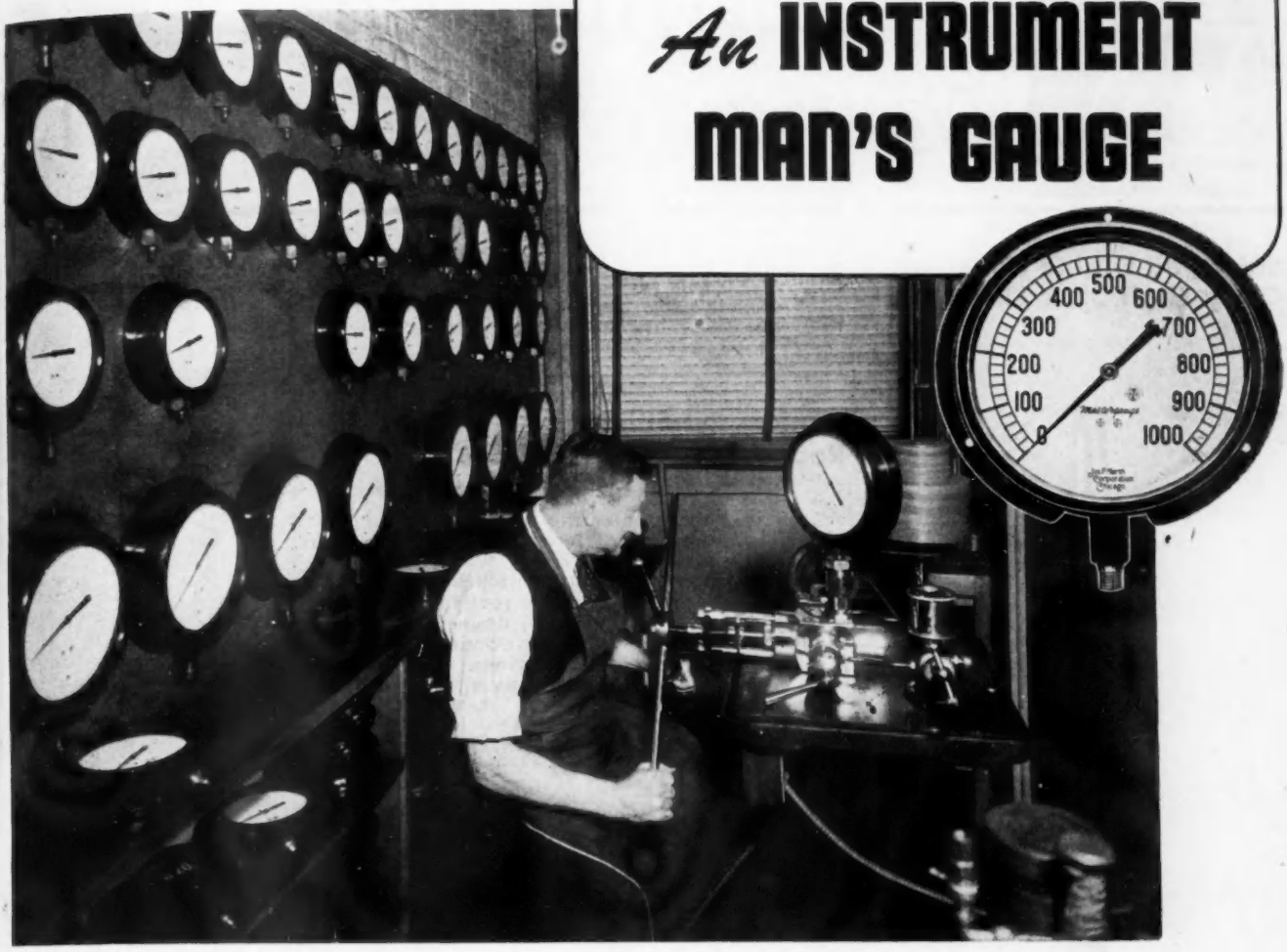
Ickes' article also is significant because it revives the question of the Arabian pipe line. His statements on this topic are of special importance because he definitely declares this would be a matter for the international commission to consider. Here are his comments on the Arabian pipe line:

"Whether or not there shall be one or more pipe lines will be a matter for the consideration and recommendation of the international commission. My own belief is that, since a pipe line is a cheap method of transporting oil and since there will be an ever-growing market that can be reached from the eastern Mediterranean, one or more pipe lines will follow as a matter of course.

"It is entirely probable that in due course, either the American interests will build a pipe line, with the British having the same privilege, or that a common pipe line will be constructed with laterals extending into Iran, Iraq, Saudi Arabia and Kuwait."

Because of the vast undeveloped oil reserves of the Middle East, one must agree with Ickes' thought that one or more pipe lines probably will be built to provide the area with a market outlet. However, one may ask whether this is a matter for the commission to decide, or whether it should be left to the discretion of the business corporations who have invested their money in developing oil fields of the Middle East.

An INSTRUMENT MAN'S GAUGE



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• Throughout the petroleum industry there are men who have lived with pressure gauges until they know every good trait and bad habit of every make of gauge under the sun.

The Marsh Mastergauge was designed for such men . . . or perhaps it would be more accurate to say that the Mastergauge was designed *by* them. Their experience was consulted—the characteristics they wanted were incorporated in the Mastergauge. That is why the Mastergauge can truthfully be called "an instrument-man's gauge".

It probably isn't necessary to go beyond your own organization to confirm this. But if it is, you can find eloquent proof that the Mastergauge gets the full vote of those who know gauges best in its widespread standardization as original equipment by the most discriminating manufacturers of products for the petroleum industry.

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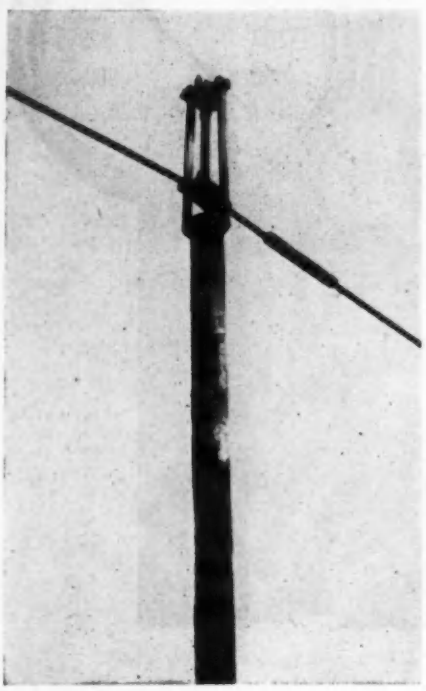
Salvaged Engine Rods Carry High Jack Line



This engine rod supports jack line and affords necessary freedom from cramping at support.

Many types of jack line supports have been devised by lease operators, but probably none is more novel and practical than the one illustrated. This operator has solved his problem by using discarded oil field engine connecting rods. The usual pipe support is provided for the jack line, but instead of the usual semi-rigid top connection to the line, a free swinging arm is allowed by use of the connecting rod. The rod is pivoted at the wrist pin end on a sucker rod shaft which is fastened to the pipe support. The lower or crankshaft end has had the babbitt salvaged and the cable is held by the bearing cap.

ROD-LINE EQUIPMENT

Two small pieces of discarded leather belting are placed on either side of the cable before it is clamped firmly in place allowing for free movement and preventing damage to the line. Another feature of this type of free swinging joint is that it affords a straight line motion to the jack line. This will prevent bending of the line with every stroke and will add greatly to the life of the line.

Oscillation of the post, in line with the cable travel, rocks rod on its bearing to afford practical parallelism through cycle.

$5.00 is paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, P. O. Box 2608, Houston 1, Texas

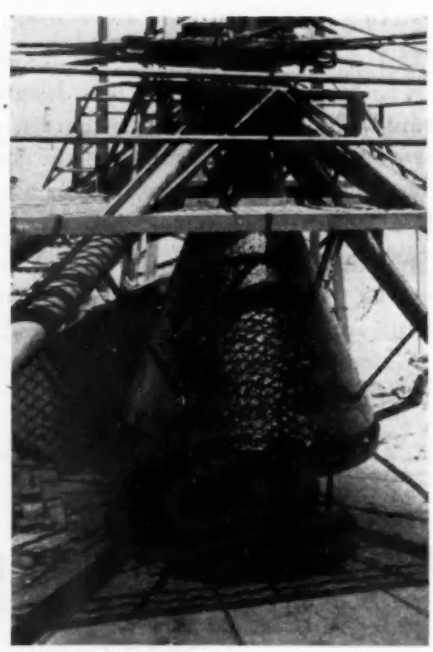
Conical Oil Shield Reduces Power Loss

To prevent waste of lubricating oil and to keep the base of the jack plant pit clean, one lease foreman constructed a simple oil interceptor which prevents spatter and drip, permitting the oil to be re-used, reclaimed or drained off without marring the surroundings.

POWER LUBRICATION

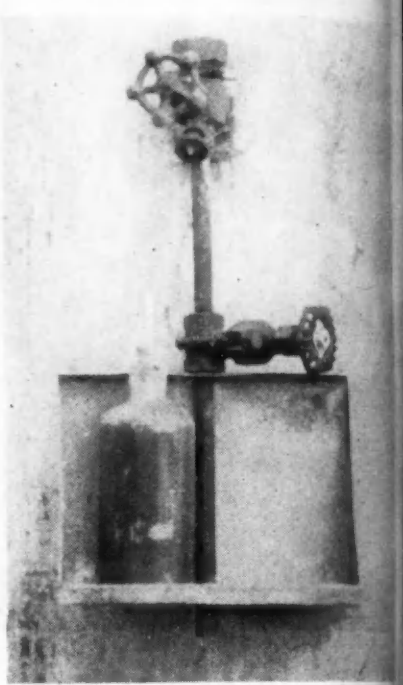
A cone, made of light sheet metal, and tapering outwardly to slightly beyond the farthest extension of the eccentric, is mounted on the vertical shaft just below the rod connections. The bottom edge of the cone is flanged to form a 3-inch collector or groove into which oil drippings collect as they make their way down the slope.

Oil from this collector may be pumped back over the bearings again. This type of cone collector has an advantage over a flat drip pan in that the oil is caught almost the instant it falls clear, and thus there exists little opportunity for it to be blown and scattered by the wind.



Surrounding shaft and carrying collecting groove, this device traps waste oil from bearings.

Handy Solvent Shelf Speeds Sample Check



Formed from light sheet steel and carried on gauge blowdown, this shelf saves gauger's steps.

A convenient shelf for solvents or small equipment was fashioned from some scraps of light tank plate by one gauger. The shelf and cover were cut to the desired size, and tack-welded to the strip which formed the sides. Holes were cut through top and bottom sheets to fit closely around the drain nipple on a nearby test cock, a standard collar being screwed up on the nipple below the bottom of the device to hold it in place, yet permit ready removal if the valve required servicing.

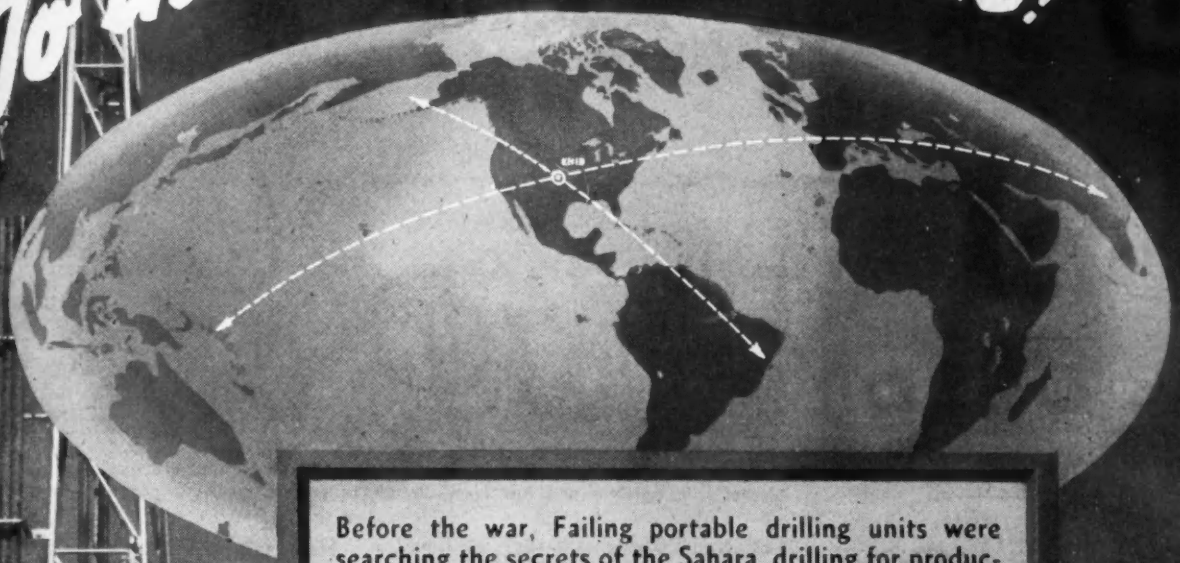
GAUGING ACCESSORIES

The shelf did not interfere with normal use of the gauge-glass blowdown cock or the securing of samples in the usual manner, while the bottles of solvent required were held handy for use during testing.

Small holes punched, burned or drilled through the bottom shelf of the device permitted drainage of any water or other fluid falling there, and prevented the unsightly accumulation of materials which might cause fire hazard or spoil the neat appearance of the lease.

Turning a flange on the bottom of the device protects against accidental dropping of bottles.

To the ends of the earth!



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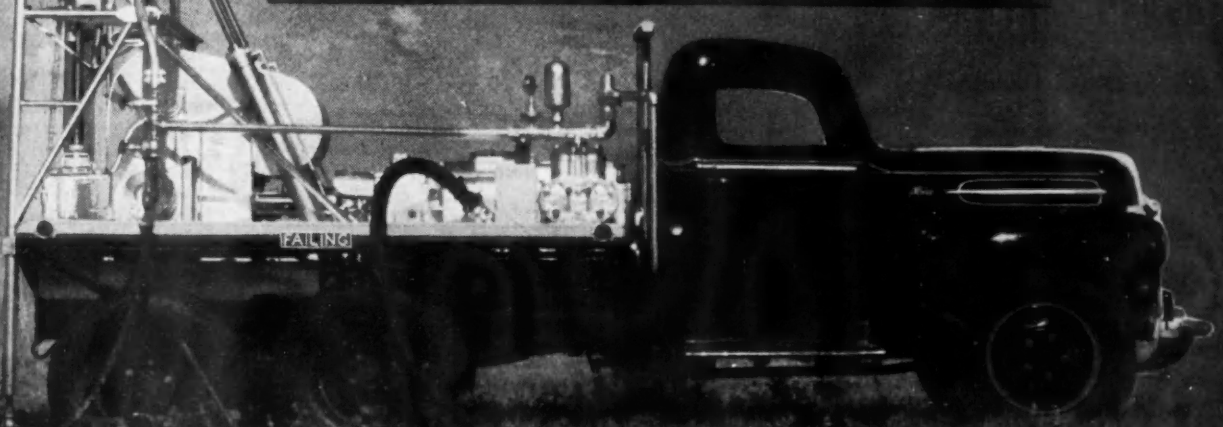

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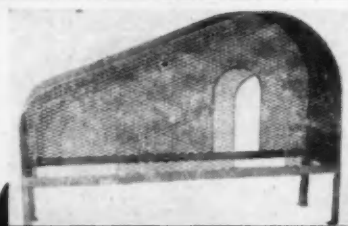

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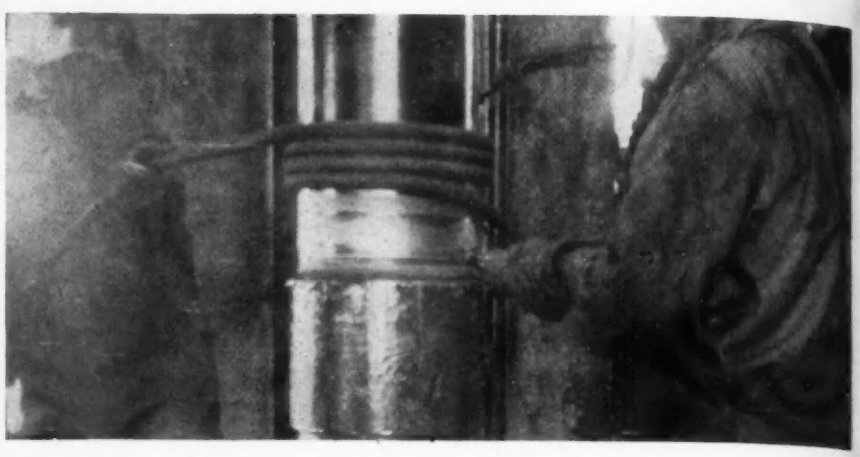
Casing Thread Chaser Prevents Fouled String



Close-grained oak paddle with sharpened edge is held against revolving pipe joint and cuts dike of salt, paraffin and rust from threads to present clean surface when string is re-run.

RUNNING CASING

A Kansas casing crew developed a simple device which makes it easier on the man charged with the responsibility of seeing that the threads are cleaned and greased after pipe is pulled. A paddle or wedge of close-grained oak is formed and sharpened to an edge which will reach the bottom of the threads in the casing.

This tool is tied with a string which, suspended from the derrick line carrying the tongs, keeps it within reach of the crewman. As the pipe is unscrewed from the collar, the wedge is held against the thread, the sharp edge being forced to the bottom of the V-groove, and cleaning it of paraffin, grit or salt encrustation.

Most thread failure is found at the last engaged thread, which is also the most favored collecting place for the corrosion-abetting salt deposit.

A variation of the simple wedge-shaped paddle with a sharpened edge is to make it of wood as before, but to cut notches or saw teeth across the face of the edge, giving a series of new scraping or chasing points as one becomes worn away or blunted by abrasive materials cleared from the pipe.

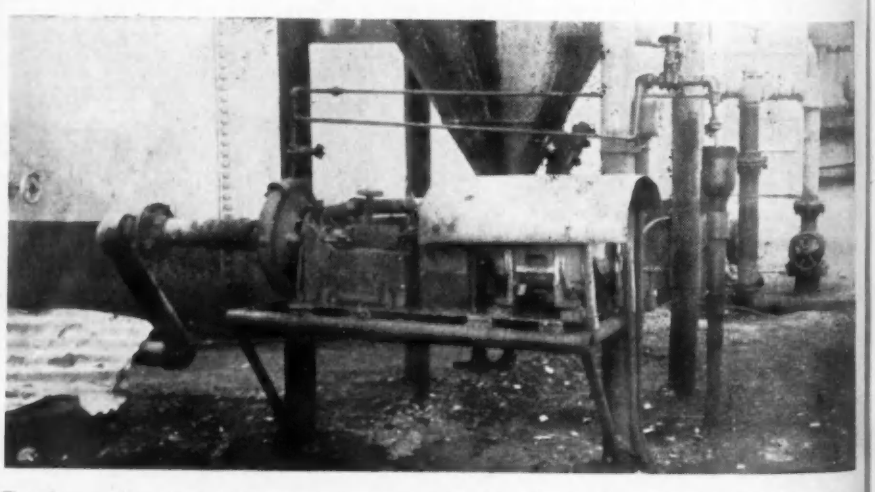
Portable Pump Stand Simplifies Sump Set-Up

LEASE PIT PUMPING

The small pump required on one lease for handling sludge and bottoms was mounted, together with its driving motor, on a base of steel plate, with a sheet steel housing over the motor to protect it somewhat from the weather.

Instead of casting the usual concrete foundation for this unit, it was placed on a light but strong foundation fabricated by the welder from scrap pipe. A rectangular frame accommodated the pump base plate, to which it was tack-welded at several points. This frame was in turn welded to two posts or risers of 3-inch extra heavy pipe, which were set into the ground to bring the pump at the desired level. Angle braces of light pipe served to tie the edge of the bracket to the posts.

To move the entire unit, it was necessary only to loosen the dirt around the two posts, apply a pull upward with the winch line of the service truck, and carry the entire set-up to the new site.



Two heavy pipe posts, set in concrete, support platform for small pump, the entire unit being removable readily for transfer to new site when former need no longer exists at original site.

Pipe Line Review

14-Mile Texas Pipe Line Completed for Sun Company

Allied Welding & Engineering Company, Houston, has completed 14.72 miles of 8-inch oil line for Sun Pipe Line Company, Beaumont, from Sun's Canales field station in Jim Wells County to the Dan Sullivan pool in Brooks County, southwest Texas.

Sun Oil Company has considerable production in the Dan Sullivan pool now delivered through the new 8-inch line to Magnolia Pipe Line Company in the Seeligson area of Jim Wells County. Plans are to lay line to deep water upon receipt of priorities, allowing Sun to handle its own oil without delivery to another carrier.

Early in 1944 Sun Pipe Line Company announced plans for considerable work in the southwest Texas area, extending present lines and laying new trunks and gathering systems but authority was denied due to critical materials. The plans probably will be carried out as soon as materials are available.

15-20 Mile Line to Texas Field Planned by Gas Firm

United Gas Pipe Line Company, Shreveport, is reported planning a 22-inch gathering system to a proposed absorption type gasoline plant in the Carthage field, Panola County, Texas.

The plant would serve the southeast portion of the field and probably would amount to between 15 and 20 miles of line.

Application Made to Move Natural Gasoline Plant

Lone Star Gas Company, Dallas, has made application to the Office of War Utilities to move a natural gasoline and rectifying plant, which it owns jointly with Rogers Lacy of Longview, Texas, to the Carthage pool in Panola County from the Willow Springs pool of Gregg County, Texas.

A 105-mile survey for a pipe line has been completed from Lone Star's Trinidad station to the proposed site in the Carthage field. Definite size of the line has not been announced, pending action on the application by the War Utilities board. The plant as now planned will handle approximately 50,000,000 cubic feet per day of natural gas.

20-Mile, 6-Inch Pipe Line In South Texas Is Planned

C. W. Sternberg, Houston, has been awarded a contract by Humble Oil & Refining Company, Houston, to lay 20 miles of 6-inch line extending from the present line serving the Imogene pool to the new Charlotte pool, South Texas. Scheduled starting date is between December 15 and 20 with completion scheduled before January 10.

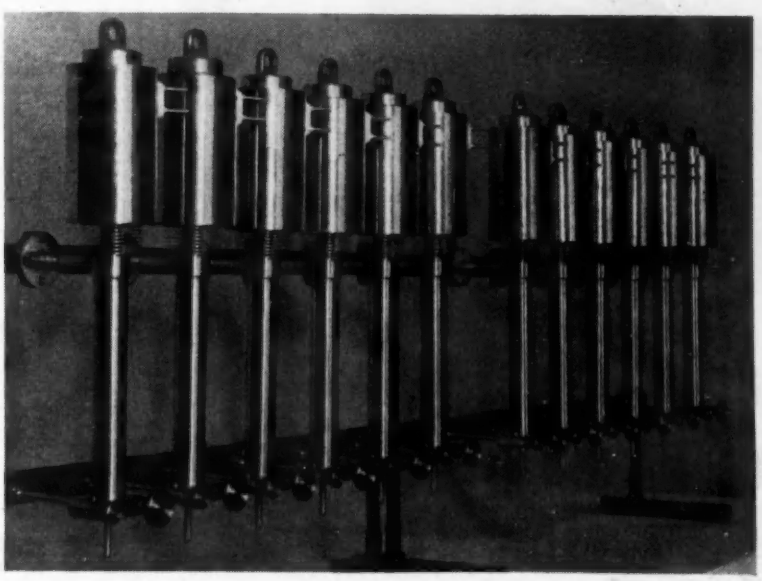
Lines to Be Taken Up for Service in West Texas

Sharman & Allen, Houston, has been awarded a contract by Gulf Refining Company, Houston, to take up 17 miles of 8-inch crude oil line near Waskom, Texas. The pipe will be reworked and used on a 63-mile, 8-inch line from the Midland, Texas, Gulf tank farm to the Keystone-Ellenburger pool in Winkler County.

H. C. Price Company has received a contract from Gulf to take up 60 miles of 8-inch line in Oklahoma. This pipe also will be reconditioned for the line from Midland to the Keystone-Ellenburger field.

Three Loops to Be Laid In Monroe-Memphis Line

N. A. Saigh Company, Houston, has been awarded a contract by Memphis Natural Gas Company, Memphis, Tennessee, to construct three loops in a line from the Monroe, Louisiana, field to Memphis beginning December 15. The loops will consist of about 100 miles of pipe with two loops to be 18-inch and the other as yet undecided.



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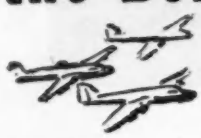

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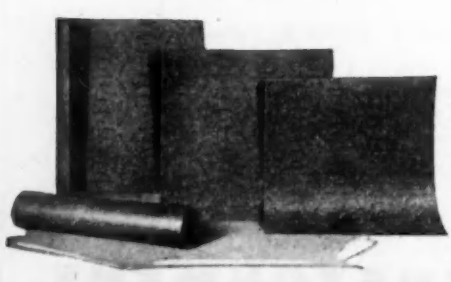

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Heavy Demands Force Drafts on Stocks In Spite of Near-Record Refinery Runs

Refinery runs of crude were further increased in the week ended December 2 and were not very far under the all-time peak reached two months ago. But it still was necessary to draw heavily on stocks of distillate fuel oil and of residual fuel oil, while gasoline accumulated in storage only at normal rate for the season. These figures emphasized the heavy demands that continue to be made upon the industry for its products.

While refinery runs have been increasing, domestic production of crude has followed a more level course, and yet crude stocks have held approximately unchanged, indicating a probable expansion of imports to supply the deficiency. In the week of December 2, domestic production was only 19,000 barrels a day greater than U. S. crude runs to stills, indicating that a very considerable volume of crude must have been supplied from imports, although there may have been some draft on crude storage. However, in the preceding week, for which crude stocks figures are available, there was a building up of crude stocks in the amount of 75,000 barrels daily, while domestic production was only 64,000 barrels a day above refinery runs.

In the week of December 2, U. S. crude production averaged 4,712,000 barrels daily, down 24,000 from the week before but still only 50,000 a day less than the all-time record set in late September. The new rate was 328,000 barrels a day or 7.5 percent higher than that of the corresponding week last year.

Crude runs to stills averaged 4,693,000 barrels daily, up 21,000 from the previous week and 341,000 daily or 7.8 percent above runs in the like week a year ago.

Stocks of crude oil totaled 221,960,000 barrels on November 25, the Bureau of Miens reported. That was only about 1,500,000 barrels more than the 23-year low to which stocks dipped in early September and was 17,800,000 barrels or 7.4 percent less than the 239,760,000 barrels held November 27 last year.

Production of gasoline, including natural blended at refineries, averaged 2,122,000 barrels daily in the week of December 2, up 43,000 from the week before and 232,000 barrels a day or 12.3 percent more than production in the corresponding week of 1943. Stocks of finished and unfinished gasoline were increased meanwhile at the rate of 115,000 barrels daily, having risen to 80,426,000 barrels. That amount was 10,514,000 barrels or 15 percent greater than the stocks of 69,912,000 barrels held December 4 last year.

Gas oil and distillate fuel oil production averaged 583,000 barrels daily, down 58,000 from the week before and 87,000 a day or 12.9 percent less than in the like week last year. Stocks were drawn upon at the rate of 181,000 barrels daily and declined to 45,832,000 barrels but remained 1,378,000 barrels above the trend for last year.

Residual fuel oil production of 1,283,000 barrels daily was 2000 a day lower than in the previous week but 77,000 a day or 6.4 percent greater than output in the like week last year. Stocks were reduced 158,000 barrels per day, although on declining to 61,727,000 barrels they still were 866,000 barrels or 1.4 percent higher than a year previously.

Total Demand for Motor Fuel Increases over 1943

Total demand for motor fuel this year will run in the neighborhood of 739,000,000 barrels, which exceeds by nearly 19 percent total demand for 1943, it was estimated last week by the Bureau of Mines. Two percent of the increase, the bureau said, will come as a result of heavier yields of gasoline from crude.

The bureau placed December demand for domestic crude at 4,741,900 barrels daily, which is 19,800 barrels more than contemplated by PAW certifications to the producing states.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

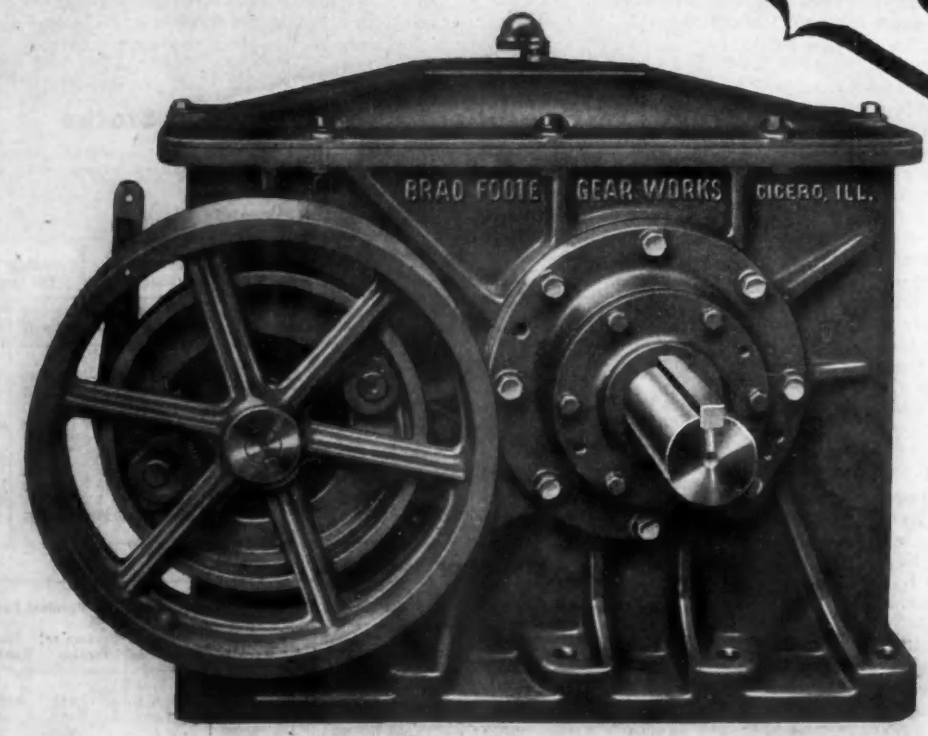
ITEM	Crude Oil Prod.		Runs to Stills		Crude Stocks		Gasoline Stocks		Gasoil and Distillate Stocks		Residual Fuel Oil Stocks	
	Barrels Daily	Week Ended	Barrels Daily	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended
Highs:												
1941	4,337	11-22	4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1- 4
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	47,861	11-14	95,857	1- 3
1943	4,436	11-13	4,331	12- 4	245,752	5-29	94,159	3-20	47,187	11-27	72,881	1- 2
1944	[1]4,762	9-30	[1]4,775	9-30	240,992	1- 1	89,162	4- 1	48,863	10-28	64,644	10- 7
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 8
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,382	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
1943	3,821	1- 9	3,579	3-13	232,191	1- 9	68,182	10-16	30,732	4- 3	57,596	12-25
1944	4,357	1- 1	4,228	2-12	[4]220,623	9- 9	76,302	1- 1	30,232	4-29	49,737	8-18

TRENDS OF 1943 AND 1944

Trends in Week Ended:	Crude Oil			Gasoline		Gasoil and Distillate		Residual Fuel	
	Production Daily	Runs to Stills Daily	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End
1943:									
January 2	3,871	3,734	233,938	10,957	82,420	4,285	42,913	7,683	72,881
January 30	3,826	3,698	233,863	10,339	88,830	3,888	37,057	7,452	70,763
February 27	3,873	3,709	235,217	10,566	93,157	4,230	32,939	7,839	70,140
March 27	3,896	3,742	239,126	10,231	94,079	3,541	30,980	8,018	67,938
April 24	3,913	3,737	242,035	10,583	91,001	3,954	31,142	8,166	67,455
May 29	3,970	3,679	245,752	10,656	83,937	3,798	32,274	7,672	67,682
June 26	3,955	4,015	242,657	11,092	79,589	3,876	34,044	8,126	67,960
July 31	4,133	3,788	238,420	11,127	74,977	3,765	36,363	8,478	66,877
August 28	4,196	4,227	236,170	12,420	72,525	4,351	37,928	8,732	67,250
September 25	3,344	4,156	233,013	12,206	70,024	4,608	40,328	8,560	66,659
October 30	4,383	4,176	247,219	12,813	69,297	4,642	44,591	7,968	63,833
November 27	4,414	4,261	239,761	12,638	69,980	4,379	46,187	8,633	62,143
December 25	4,363	4,185	241,310	12,597	74,024	4,457	43,791	8,689	57,596
1944:									
January 1	4,357	4,453	240,992	13,192	76,302	4,575	42,310	9,141	57,330
January 29	4,409	4,359	240,251	13,427	81,085	4,054	37,266	8,889	52,857
February 26	4,423	4,377	237,137	13,183	85,248	4,558	33,766	8,952	51,387
March 25	4,385	4,443	236,285	13,362	87,287	4,979	31,319	9,013	51,669
April 1	4,383	4,435	234,667	13,824	89,162	4,450	30,530	8,567	51,326
April 29	4,431	4,300	235,342	13,126	88,462	4,284	30,236	8,398	49,985
May 27	4,514	4,532	234,423	13,502	86,468	4,702	32,035	8,568	49,812
July 1	4,587	4,638	228,860	14,052	83,559	4,496	35,360	8,872	52,235
July 29	4,608	4,627	225,112	14,115	82,665	4,833	38,135	8,900	56,280
August 26	4,667	4,698	222,931	14,112	80,740	4,566	41,453	8,680	59,839
September 30	[1]4,762	[1]4,775	222,393	14,494	78,028	4,622	45,329	9,292	64,226
October 28	4,740	4,658	223,235	14,117	79,058	4,772	48,705	8,985	64,382
November 4	4,719	4,570	222,894	14,152	78,409	4,569	48,477	8,570	63,444
November 11	4,727	4,650	222,467	14,464	78,091	4,492	48,259	9,431	63,999
November 18	4,738	4,567	221,431	14,579	78,741	4,436	48,017	8,824	63,301
November 25	4,736	4,672	221,960	14,549	79,625	4,484	47,101	8,992	62,835
Dec. 2, 1944	4,712	4,693	.....	14,853	80,426	4,082	45,832	8,981	61,727
Dec. 4, 1943	4,384	4,352	[5]239,760	13,227	69,912	4,689	44,454	8,440	60,861
Change:									
In week	−24	+21	+529	+304	+801	−402	−1,269	−11	−1,108
In year	+328	+341	−17,800	+1,626	+10,514	−607	+1,378	+541	+866
In year	+7.5%	+7.8%	−7.4%	+12.3%	+15.0%	−12.9%	+3.1%	+6.4%	+1.4%

[1] All time peak. [2] Lowest between January, 1922 and July 1, 1944. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent states. [4] Lowest since December, 1921. [5] Stocks, November 27, 1943.

LITTLE GIANT of the Oil Field



This Brad Foote Product—for certain kinds of oil field service, cannot be beat. It is low in price and fills a demand for units where a central power or heavier units are not required. Made in 5 H.P.—10 H.P.—15 H.P.—20 H.P.—with peak torque rating from 24,750 to 69,500 inch pounds. Helical gearing made of alloy steel with hardened teeth, (550-600 Brinell), mounted on Timken Tapered Roller Bearings—shafts of chrome nickel molybdenum steel heat treated forgings—housings 30% semi-steel. This speed reducer is noted for its long service records and does the job exceedingly well.

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U. S. Field Operations

Oklahoma

Extensions of Two Pools Promise to Be Important

Two southern Oklahoma oil pools opened this year are getting extensions and promise to become important producers. In Carter County, The Texas Company's Ramsey 1, SE SW SW 32-4s-1w, recovered oil-cut mud on drill-stem test in the Pennsylvanian at 3728-55 feet. Oil shows were logged in cores at 3745-55 and 3730-45 feet. The well is ¼-mile northwest of production. Covering approximately 800 acres the pool has 10 producers and 7 producing horizons have been logged in the Pennsylvanian zone.

Garvin County: Ohio Oil Company's Feaster 2, NEc 13-3n-1e, is ¼-mile northwest extension to the East Pauls Valley pool. Bottomed at 3167 feet, it flowed through casing perforations from 2990 to 3004 feet. The pool produces from the McKinney, Burns and Bromide sands and although defined on the south it covers about 1500 acres and has 26 producers and 10 drilling wells.

West Edmond: Despite bad weather, operators continue to add new producers to the tri-county pool with 19 completions reported in the last few days bringing the number of producers to 268. The Oklahoma County sector continues to lead with Phillips Petroleum Company, Continental Oil Company and Gulf Oil Corporation completing good wells. Phillips' Clell 2, CSE NE 6-14n-4w, flowed 155 barrels of oil in 3 hours through tubing from 7210 feet with casing set 7 feet off bottom; Gulf's Paul 3, CSW SE 8-13n-4w, tested 205 barrels of oil daily through tubing choke; Continental's Mason 1, CSW SE 5-14n-4w, has a potential of 1385 barrels a day. All are Hunton lime producers.

In the Logan County sector, Cities Service Oil Company's Gaffney 1, CSE NE 29-15n-4w, continues to produce 200 to 250 barrels of distillate plus 5,000,000 cubic feet of gas daily from the Bartlesville zone. Operator has had considerable trouble killing a gas leak which required 3 squeeze operations using 365 sacks of cement.

In Canadian County, Stanolind Oil & Gas Company recovered fish and was drilling below 6450 feet in Drake 2, CSE NE 13-14n-5w; Drake 4, CNW NE 13, was below 4100 feet; Young 2, CNE NE 25, at 7016 feet, continued swabbing after flow died.

Sohio Petroleum Company's Robson 1, CNE NE 12-13n-5w, looks like a failure. After perforating Hunton lime at 7095-7115 feet, the hole filled with 2500 feet of water when squeezed and reperforated at 7070-80 feet in the Frisco section of the Hunton lime, the well again tested salt water and operator plans to plug back to 7000 feet for a test of upper formations. Bartlesville sand was missing and electrolog showed slight kick in the Prue.

Stephens County: Magnolia Petroleum Company has had trouble completing Jones 1, CNW SE 21-1n-4w, pool opener west of the Robberson pool. After a drill-stem test at 5533-96 feet recovered plenty of black oil and cores showed 65 feet of soft, saturated sand, casing stuck while being set at 5400 feet. Then the drill pipe froze in the hole and operator was washing to free pipe. Considerable lease and royalty trading has resulted from the strike, which is considered of major importance.

Payne County: Hanlon-Buchanan, Inc., acquired a block and plans to test in SE SE 18-19n-2e, west of the West Stillwater pool. Acreage was assigned by R. A. Arnold, consisting of the NE SE SW 18, SW 17, and SE 7, Arnold retaining the SE SW 7. The Texas Company holds the NW 18. Parker-Duerr Drilling Company has the contract.

South Moore: Mid-Continent Petroleum Corporation completed Westermier 2, NE NW SW 26-10n-3w, Cleveland County, for 595 barrels of oil daily from deep Wilcox sand at 8813-45 feet, and the well has been pinched back to 300 barrels daily. Its Brand 2, NE SE NW 26, was coring at 9208 feet after testing dry in the Wilcox topped at 8884 feet, low with other field producers, and is headed for Arbuckle lime.

Bryan County: Amerada Petroleum Corporation et al's Williams 1, NE NE SW 27-6s-7e, wildcat west of Durant near Mead, was drilling below 1300 feet after topping Mayes lime at 870 feet and Woodford shale at 1040 feet, considered high.

Marshall County: The Texas Company's Bounds 1, NE NE SE 26-3s-5e, wildcat south of Madill, was drilling below 5125 feet.

Kansas

Wildcat Near Brown County Pool Opener Is Failure

Fred Culpepper abandoned Lamparter 1, SW SE 3-2s-14e, Nemaha County wildcat near Sabetha on a farmout from Ohio Oil Company. Drilled to 2900 feet, the well topped Hunton lime at 2830 and had slight stains and odor but not enough shows to warrant a test. The failure is ¼-mile south of an unsuccessful try by Ohio early this year and was drilled on the heels of a pool opener in Brown County about 8 miles northeast.

Phillips County: Skelly Oil Company

Wells Completed in United States in Week Ended December 9, 1944

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS This Week	Last Week	Cumulative This Year	Cumulative Last Year
Alabama	....	....	....	....	....	....	1	....	....	1	1	2	37	2
Arizona	....	....	....	....	....	....	....	....	....	....	....	....	6	5
Arkansas	....	....	....	....	....	....	....	....	2	2	2	2	212	239
California	41	1	....	....	42	1	....	....	2	2	45	37	1,938	1,378
Colorado	....	....	....	....	....	....	....	....	....	....	....	....	26	26
Florida	....	....	....	....	....	....	....	....	2	2	2	....	5	5
Georgia	....	....	....	....	....	....	....	....	....	....	....	....	7	4
Illinois	33	1	....	12	46	1	....	....	9	9	56	51	1,917	1,706
Indiana	2	....	....	1	3	....	....	....	3	3	6	15	334	270
Iowa	....	....	....	....	....	....	....	....	....	....	....	....	2	3
Kansas	14	1	....	8	23	....	....	....	12	12	35	43	1,637	1,635
Kentucky	9	....	....	5	14	....	....	....	1	1	15	27	723	397
Louisiana	10	1	....	5	16	....	1	....	3	4	20	19	743	622
North Louisiana	3	....	....	1	4	....	....	....	1	1	5	8	262	295
South Louisiana	7	1	....	4	12	....	1	....	2	3	15	11	481	327
Michigan	10	3	....	5	18	....	1	....	6	7	25	18	658	559
Mississippi	3	....	....	....	3	....	....	....	....	....	3	8	198	90
Missouri	....	....	....	....	....	....	....	....	....	....	....	....	39	28
Montana	....	....	....	....	....	....	....	....	....	....	....	....	308	217
Nebraska	....	....	....	....	....	....	....	....	1	1	1	....	12	38
New Mexico	6	....	....	....	6	....	....	....	1	1	7	12	393	252
New York	15	....	10	....	25	....	....	....	....	....	25	25	1,186	1,166
Ohio	8	2	....	1	11	....	....	....	....	....	11	9	803	715
Oklahoma	30	....	....	11	41	....	....	....	5	5	46	47	1,793	1,373
Pennsylvania	28	5	15	1	49	....	....	....	....	....	49	50	2,725	2,390
Tennessee	....	....	....	....	....	....	....	....	....	....	....	....	9	6
Texas	67	15	....	19	101	6	5	1	26	32	139	119	5,819	4,025
E.Tex.Bor. Co.'s	....	1	....	....	1	....	....	....	....	....	1	....	32	18
E. Texas Field	....	....	....	....	....	....	....	....	....	....	....	....	3	5
Rest of E. Texas	5	3	....	....	8	....	....	....	1	1	9	3	270	234
North Texas	12	....	....	6	18	4	3	....	6	9	31	17	1,326	1,012
W. Central Tex.	3	....	....	3	6	....	....	....	2	2	8	11	401	364
West Texas	29	....	....	2	31	2	1	1	9	11	44	34	1,549	896
Tex. Panhandle	5	3	....	1	9	....	....	....	....	....	9	11	269	185
G. Coast, Upper	5	3	....	2	10	....	1	....	....	1	11	13	570	310
G. Coast, Lower	6	4	....	4	14	....	....	....	4	4	18	12	868	595
Southwest Texas	2	1	....	1	4	....	....	....	1	1	5	14	428	345
S. Central Tex.	....	....	....	....	....	....	....	....	3	3	3	4	103	61
Utah	....	....	....	....	....	....	....	....	....	....	....	....	1	....
West Virginia	4	14	....	6	24	....	....	....	....	....	24	12	900	651
Wyoming	....	....	....	....	....	....	....	....	....	....	....	....	155	114
Total U. S.	280	43	25	74	422	8	8	1	73	82	512	496	22,586	17,916

*Includes distillate wells. †Includes salt water disposal wells.

set oil string in Thayer 1, SEc NE 34-5s-19w, wildcat and possible pool opener 7 miles east of the Ray field. Arbuckle was topped at 3485 feet and cores at 3265-80 in Kansas City lime, and at 3485-90 feet in the Arbuckle showed good saturation and porosity.

Rice County: A new pool loomed in Nelson Drilling Company's Allison 1, NEc 23-19s-6w, wildcat north of the Smyres pool, as testing got under way. Five-inch pipe was set at 3342 feet and after drilling plug and deepening to 3384 feet, the hole filled with 1000 feet of oil from Mississippi chat topped at 3341 feet.

Ellis County: Max Cohen et al logged oil and water in Madden Estate 1, NW NW NE 4-13s-17w, wildcat northeast of the Catherine pool. Arbuckle was cut at 3792 feet and hole carried to 3501 feet. Brunson et al's Schmeidler 1, NW NW SE 28-12s-17w, 3 miles south of the Bemis pool, is bottomed at 3634 feet in Arbuckle lime with considerable oil standing in the hole as operator rigged for pumping.

Pratt County: Skelly Oil Company's Kiley 1, wildcat in SE SE NE 24-29s-14w, was abandoned at 4525 feet. Pipe was set at 4463 feet and plug drilled out and hole deepened to 4487 feet, where a slight oil show and some water was recovered after shooting the section from 4467-87 feet. Final test from bottom recovered 3000 feet of water in one hour.

Leavenworth County: After deepening from 689 to 718 feet, Huber Corporation's Mohler 1, CNW NE 22-12s-20e, gas strike northeast of Lawrence, increased its flow from 500,000 to 1,200,000 feet per day at 270 pounds rock pressure. Six-inch casing was set at 689 feet and the test had 44,000 feet per day at 450-80 feet. There was another showing at 700 feet, at which plug was drilled to 709 feet, where it developed 500,000 cubic feet of gas under 235 pounds rock pressure.

Jefferson County: Magnolia Petroleum Company's Imus 1, SE NE SW 15-10s-19e, near the McLouth pool, was dry and abandoned at 2235 feet after several tests in Hunton and Viola lime failed commercially.

Nebraska

Hitchcock County: Topping the granite at 5014 feet and drilling to 5018 feet, The Texas Company abandoned Eagle 1, CSE SW 29-4n-35w, wildcat northwest of Trenton. Arbuckle lime was cut at 4900 feet and Reagan sand at 5011 feet with no shows reported.

Oklahoma Pool Production

The Oklahoma City pool, discovered December 4, 1928, produced 606,218,955 barrels of oil up to December 1, according to a report by the Oklahoma Corporation Commission. Wilcox zone wells are credited with 455,707,874 barrels; lower Simpson zone wells with 121,623,941 barrels, and miscellaneous zones with 28,887,140 barrels.

Leases Purchased

Emmett Worstell has purchased Frank Henthorn's interest in leases in Okmulgee County, Oklahoma, formerly operated by Henthorn & Worstell.

Kansas Rocks Classified

The Kansas State Geological Survey has issued Bulletin 52, "Tabular Descriptions of Outcropping Rocks in Kansas," which summarizes knowldege of outcropping rocks,

New Mexico

Clear Fork Zone Near For Lea County Wildcat

The Texas Company's State 1-A-G, Lea County wildcat and 2½ miles north of northwest Vacuum area, was drilling hard lime at 8510 feet in Glorietta, topped at 5990 feet, with Clear Fork zone due near the 7000-foot level. The company's Swearingin 2, 1¾ miles northwest of the North Lynch pool, was abandoned at 4769 feet.

Continental Oil Company et al's Skaggs 2-B-23, wildcat between the Monument and Skaggs areas, continued to test water in plugging back by stages, having recovered 7200 feet of sulphur water with perforations at 8450-8525 feet.

Humble Oil & Refining Company's Keinath 1, near the edge of Lea County, was drilling shaley lime at 9620 feet. It is 4¼ miles northwest of the company's Simms 1, Andrews County, Texas, failure at 9440 feet in Pennsylvanian chert. Both logged a nominal oil show in the 7400-foot Clear Fork.

West Texas

Test Near Andrews Strike Logs Favorable Saturation

Mid-Continent Petroleum Corporation's University 1, Lease 11, 1850 feet southwest of its prolific Devonian oil strike for the southwest sector of the Fullerton field, Andrews County, logged favorable oil saturation and porosity at 8412-50 feet in Devonian, topped at 8408 feet with elevation of 3288 feet.

Drill stem test is pending, then it will be deepened to near the 8600-foot level as the discovery perforated at 8460-8600 feet without encountering water, while the confirmation test is somewhat higher structurally.

These are the only deep tests in or near the field, although Magnolia Petroleum Company's Ralph 1-A, a mile west of production and a scheduled deep test, was drilling at 8095 feet. Should the Devonian prevail throughout the field, operators likely will switch from 5½-inch to 7-inch oil string on top of the Fullerton zone in order to be prepared to deepen in the event of small production from the latter.

Frankel Bros. et al's University 1-E, 1⅛ miles southeast of Fullerton field production, and surrounded by high-priced acreage, appeared safely within the production contour in recovering a maximum of 1710 feet of gas-cut mud when tester was used twice at 6850-7000 feet. This outpost logged first oil stain at 3305 feet, and indicated effective saturation at 6950-70 feet with elevation of 3305 feet.

Sun Oil Company's Martin 1, 2⅔ miles northwest of the West Andrews field, was coring below 5610 feet in Clear Fork, topped at 5590 feet with elevation of 3314 feet. This zone showed nominal oil-staining, but subnormal in porosity.

Stanolind Oil & Gas Company's University 1-D, 3½ miles west of the West Andrews field, was drilling at 9790 feet in Simpson, topped at 9290 feet, or 1250 feet high to a 11,322-foot granite test 3¼ miles west by south.

The Texas Company's University 1-M, north offset to its Holt lime discovery on the east side of the Emma field, Andrews County, cemented 7-inch casing at 5420 feet, 6 feet off bottom, to complete through perforations after recovering 39 stands of oil and 11 stands of sulphur water when tested was used at 5350-5405 feet.

Winkler County: Sun's Keystone 2, 2 miles north by west of nearest deep producer in the Keystone area, entered the Ellenburger at 10,337 feet, or 116 feet low to nearest deep well, and was making a drill stem test at 10,360 feet. This zone shows some porosity and stain, but has a sulphur odor. A producer is anticipated from the Waddell topped at 10,085 feet, with the 8500-foot Silurian considered the best bet. Gulf Oil Corporation's Keystone 49-E, ⅞ mile southwest of nearest Ellenburger production, and structurally high, resumed drilling after testing at a rate of 16,220,000 feet of gas daily with distillate spray at 9148-9250 feet.

Tom Green County: The Texas Company's Garmon 1, C SW NW S.P. Ry. Sec. 85, District 11, 6 miles southwest of Mereta, was drilling at 5141 feet in Strawn sand, and will explore the Ellenburger before making re-test of a 20-foot zone of oil saturation. This wildcat logged favorable saturation at 4960-80 feet with elevation of 1836 feet, but drill stem test at 4950-5041 feet failed to reflect this show in yielding 40 feet of drilling fluid.

Ector County: Shell Oil Company and Cities Service Oil Company's T. P. Land Trust 1, wildcat that indicated oil production from 3 zones in drilling to water in Ellenburger at 9980-10,081 feet, tested a small amount of salt water and cut-oil after acidizing Silurian perforations at 8810-20 feet. This showing is disappointing as the well previously tested gas at a rate of 1,584,000 cubic feet daily, and recovered 4970 feet of 31.8-gravity oil when tester was used at 8800-47 feet. Perforations will be squeezed to test the Devonian, topped at 7860 feet.

The Texas Company's T. P. Land Trust 1-B, 4 miles southeast of the above prospect and 3¾ miles east by south of the Wheeler-Ellenburger field, was fishing in shaley-lime at 7752 feet, having entered the Wolf Camp near the 7610-foot level. The latter's geological column is said to conform more to the Wheeler-Ellenburger area than the tests to the north.

Upton County: Humble Oil & Refining Company's Parrott 1, wildcat and 14 miles northwest of the Big Lake field, is due to perforate opposite more favorable oil saturation in Clear Fork at 7560-75 feet after swabbing dry from perforations at 7250-7310 feet. The latter zone was treated with 500 gallons of mud acid, and some evidence of free oil was noted in unloading the hole.

Standard Oil Company of Texas McElroy 1 and Magnolia Petroleum Company's American Republics 1 were drilling at 6970 feet, and fighting cavity at 7768 feet, respectively. Both have been carried beyond original depth goal on strength of the Parrott test's showing.

☆

O. H. CARLISLE, division manager of the Gulf Refining Company, was honored recently in Houston with a dinner celebrating his 40th year with the company.

CHRISTMAS

1944

At this fourth Christmas of America at war, we feel that peace is not too far away . . . Houston businessmen have found throughout the year that The City National Bank has been a real and personal help to them—in the thinking and planning they must do on their wartime jobs, and in adjusting their perspective to the long view of the bright new world to come.

After Christmas there will be days of preparation for peace, and the friendly officers of The City National Bank will be happy to discuss your reconversion problem with you.

To our many friends, a cordial wish for a Merry Christmas.

THE CITY NATIONAL BANK
HOUSTON

North Texas

Production from Ellenburger Assured by Cooke Prospect

Production from the Ellenburger was confirmed by a prospect northwest of the Walnut Bend field, Cooke County. An eastern King County wildcat encountered more effective pay, indicating a prolific Strawn area.

Cooke County: The Texas Company's Gainesville National Bank 1, Block 7, T. W. Ward Survey and a mile northwest of Strawn production in the Walnut Bend field, flowed 25 barrels of oil the first 15 minutes and 19 barrels the next 30 minutes from Ellenburger saturation at 5425-66 feet, having plugged back from 5757 feet to 5485 feet. The zone will be acidized. This wildcat entered the Simpson at 5295 feet and the Ellenburger at 5373 feet, being 56 feet low and 86 feet high, respectively, on these markers when correlated with the 6055-foot (failure) water disposal well separating it from the district's third most productive field.

The Texas Company's Rasure 1, discovery Strawn well for the Sivels Bend geophysical prospect, pumped 139 barrels of 35.6-gravity sweet crude initial from perforations at 6755-63 feet, having plugged back from 7518 feet. Prior to official gauge the well pumped and flowed 190 barrels of oil daily. The company's Beasley 1, ⅞ mile west by south, was drilling shale at 5825 feet. Sun Oil Company is offsetting the discovery, while Magnolia Petroleum Company is due to start a north offset. S. D. Johnson et al (formerly F. C. Blagg's) Rosson 1, BBB&C Ry. Section 19, a mile southeast of the T.C.U. - Lynn pool, drilled plugs from 5½-inch casing at 1585 feet to 1589 feet for rated flow of 20,000,000 cubic feet of low-BTU content gas, and was shut in.

King County: Ohio Oil Company's Ross 1, R. B. Masterson Survey 24 and 9 miles west by south of the Bateman 2-pay area, landed 5½-inch casing at 5236 feet to complete in main Strawn lime saturation at 5239-57 feet, having flowed oil through tester from this zone, with bottom hole pressure calculated at 2200 pounds in 3 minutes.

Ross 1 is on a 6193-acre lease, and had previously indicated production possibilities at 5124-33 feet.

Wilbarger County: Big Six Oil Company's Schlaffke-Morris 1-A, first deep test for the Harrold tri-pay Strawn pool, made a firm bid for Ellenburger production in recovering 350 feet of densely oil-loaded rotary mud when tester was used at 5050-5106 feet in Ellenburger, topped at 4986 feet.

In the Odell pool, Fain & McGaha's Sumner 1, east offset to its discovery, flowed 112 barrels of oil natural on 4½-hour test through ½-inch choke from Palo Pinto saturation at 4778-4809 feet.

The Texas Company's Pigg 1, ⅝ mile west outpost, cemented 7-inch casing on bottom at 4843 feet after a favorable drill stem test. This outpost topped the Palo Pinto at 4714 feet, being 20 feet low, but top of pay is higher in section.

Wichita County: The Texas Company's Thom 15, twin location to a 3800-foot Strawn producer, opened a new shallow pool in the southwest portion of the K-M-A field, in pumping 92 barrels of oil on 12-hour test from sand at 1795-1804 feet with well bottomed in shale at 1805 feet. It is 7000 feet east of nearest shallow production, and is a significant strike since some of the nearby Strawn wells logged a maximum of 25 feet of saturation in the shallow zone.

Throckmorton County: Standard Oil Company of Texas and Hanlon-Buchanan, Inc.'s Donnell 2, Murray field, cemented 5-inch casing at 4499 feet to dual complete, having tested 4.7 barrels of oil and 8/10-barrel of oil cut mud, with 2200 pounds bottom hole pressure when tester was used in Mississippian at 4508-18 feet. Production was also assured from Bend at 3790-3810 feet.

Foard County: The Texas Company's Bell 1, Abb Luce Survey and 4 miles south by east of Crowell, entered the Ellenburger near the 5830-foot level, and tested 5590 feet of water on drill stem test at 5834-5900 feet. Electrical log will be made to ascertain whether a further test will be made of conglomerate zone, topped at 5415 feet with 55 feet of oil cut salt water showing on drill stem test at 5415-28 feet.

Clay County: Anderson-Prichard Oil Corporation's Wood 1-A, southwest flank of the Petrolia field granite uplift, cemented 5½-inch casing at 6182 feet after finding the Ellenburger barren at 6571-6672 feet. This wildcat indicated flowing production when tester was used in conglomerate saturation at 5929-59 feet, having entered the Bend at 5884 feet, or 59 feet high to a 6769-foot failure 3¾ miles east. Additional pay was logged at intervals to 6080 feet, possibly embracing the Mississippian.

J. C. Tenison Is Elected Head of Dallas National

Dallas National Bank, Dallas, announces election of J. C. Tenison, as president to succeed the late Ernest R. Tennant. Tenison has been in the banking business since 1908 when he started as a runner and collector for the old City National Bank, in Dallas. In 1916 he became a member of the firm of E. O. Tenison and Sons, a private bank which in 1917 was nationalized as Tenison National Bank. He became vice president of the institution when Tenison National Bank merged with the City National Bank in 1920. He served as cashier of Dallas National Bank, which consolidated with Dallas Bank and Trust Company, in 1931, and later became vice president.

Joe Agee was named executive vice president and Roger L. Tennant was elected to the board of directors. Agee started with the bank in February, 1917, and has been with the institution in various capacities since. Tennant has extensive business interests in Dallas.

WLB Seeks More Flexible Oil Wage Than Dallas Rate

The War Labor Board disclosed November 30 that it has assigned two analysts from its wage stabilization division to make a study to determine whether wage brackets set up for the petroleum industry by the regional board at Dallas can be made "more flexible."

A spokesman for the board explained that the wage brackets are considered too rigid for small companies in competition with the big refineries.

East Texas

To Test Oil Saturation In Van Zandt Prospect

The Texas Company's Stout 1, second deep test for its geophysical prospect in southwestern Van Zandt County, set pipe to test oil saturation at 8150-60 feet in lower Rodessa.

A drill stem test at 8154-60 feet yielded the water cushion along with a stand of free oil, 2 stands of rotary mud, and a stand of salt water, with bottom hole pressure calculated at 1390 pounds. Stout 1 is 2500 feet north and higher structurally than the company's Easley 1, which tested some oil and water from about 24 foot porous zone topped at 8211 feet, then abandoned at 9116 feet. Humble Oil & Refining Company's Bruce 1, 4 miles south of Edgewood, proved dry in perforations at 8524-44 feet, having plugged back from 8904 feet. Magnolia Petroleum Company's Phillips 1, north offset to the Fruitvale discovery pumper and only lower Trinity producer in Van Zandt County, cemented 5½-inch casing at 8698 feet to test the 8600-foot Travis Peak sandstone.

Hopkins County: Onyx Refining Company and Hollingsworth Drilling Company's Cundill 1, Peerless area, was drilling shale at 4385 feet in Barren Woodbine topped at 3870 feet. In the Picton field. Sun Oil Company's Phillips 1, 2 miles northeast and flat with the discovery, failed to recover junk at 6605 feet and will sidetrack.

Henderson County: Lone Star Producing Company's Lee 1, 3½ miles north of Athens, was drilling dry Travis Peak sandstone at 9010 feet. It will be plugged back for a further test of oil saturation in top of the Rodessa at 8198-8203 feet with nominal porosity at 8270-76 feet. The Texas Company's Morse 1, Travis Peak project for the Chandler area, logged first anhydrite at 8400 feet, and was drilling limy-shale at 8940 feet.

Wood County: Bobby Manziel et al's Evans 1, 2 miles east of Quitman and a failure in the Woodbine, swabbed a small volume of 19-gravity black oil from sub-Clarksville perforations at 4860-4944 feet and will make pumping test.

Freestone County: The Texas Company's McKnight 1, prospective gas-distillate discovery in the Travis Peak for the Fairfield area, was making progress in cutting out and recovering stuck drill pipe while bottomed at 8293 feet.

Harrison County: Stanolind Oil & Gas Company and Continental Oil Company found another soft spot in the Pettit horizon at 6662 feet at J. H. Harris 1, T. Gray Survey, the first foot of which was drilled in 6 minutes and the second in 4 minutes. Crews were reported circulating before orders for further drilling. The well recently logged slightly porous lime with good gas odor in the second porous zone of the Pettit from 6507-12 feet and on a drill stem test from 6498-6512 feet, using ¼-inch top and bottom chokes, recovered 1488 feet of drilling mud with no showing of oil, gas or formation water. The wildcat is scheduled to the Travis Peak or 7000 feet.

Angelina County: Humble Oil & Re-

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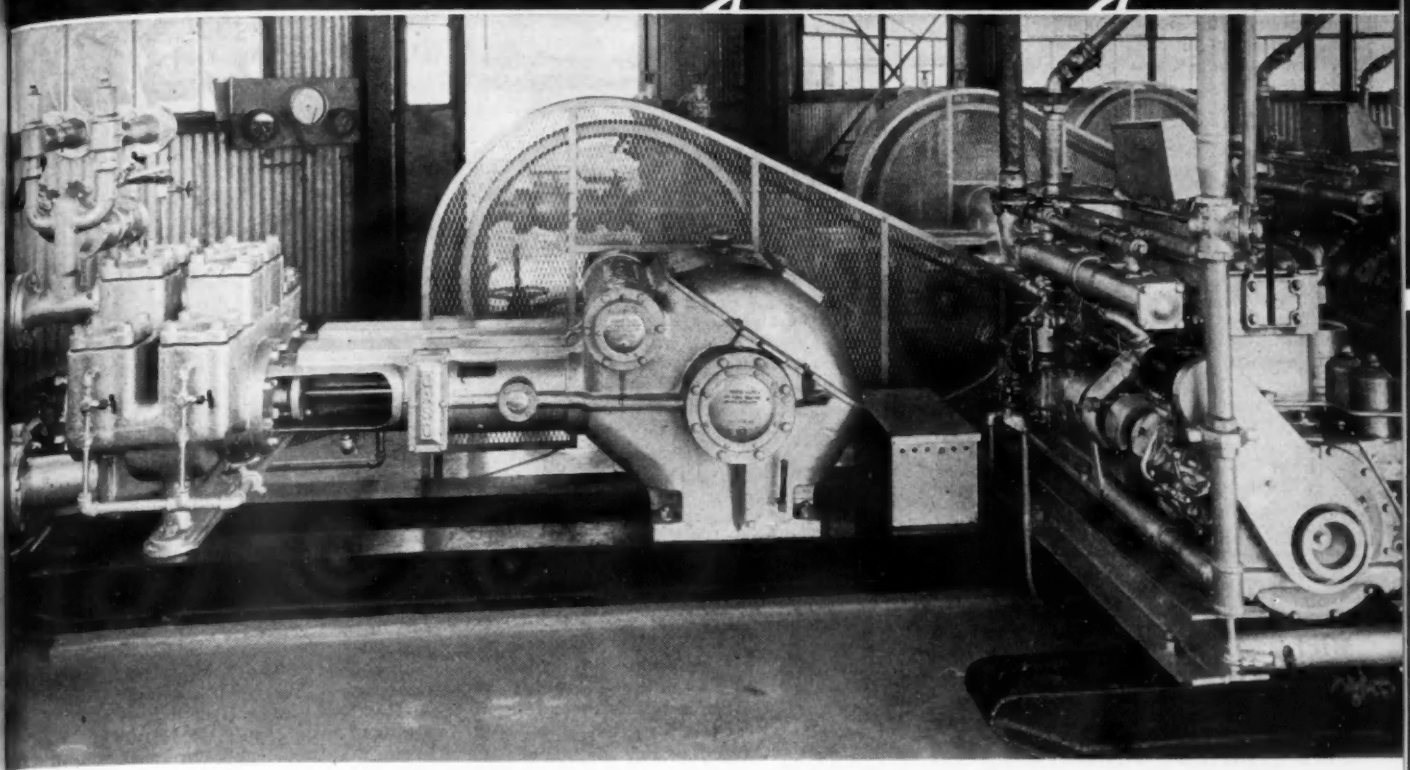

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GASO PUMPS

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fining Company is drilling below 6248 feet in Angelina Lumber Company 1, W. H. Herring Survey.

Shelby County: Humble's Pickering Lumber Company 1, S. Francois Survey, is drilling in black shale at 5464 feet.

Southport Petroleum Company's Poore 1, Holmes Byfield Survey, 4 miles northwest of Pickering, is drilling below 6293 feet. A drill stem test from 5624-48 feet on ¼-inch choke open top and bottom for 15 minutes registered a slight blow at surface and recovered 40 feet of mud with slight gas and distillate taste, no salt water.

Bowie County: A. M. Sutton's J. G. Newkirk 1, Jessie Dean Survey, deep wildcat test 6 miles northeast of Avery, is shut down at 2280 feet.

San Augustine County: M. E. Davis was drilling at 5214 feet on daylight tour in C. Thomas 1, W. B. Horn Survey. Wilcox was logged at 2530 feet, without shows. Cores from the Buckrange, topped at 4276 feet, recovered shaly sand without shows. A core from the Blossom sand at 4385-95 feet recovered sand showing water.

Southwest Texas

Victoria Test Believed Good For 40,000,000 Feet Daily

Gulf Oil Corporation's Mary Simmons 1, in the Kemper City area, which opens a new gas field for Victoria County, has been shut in while awaiting official gauge, but has been estimated good for 40,000,000 cubic feet of gas daily, open flow. Drilled to 6335 feet, casing was perforated for completion at 5350-58 feet after having shown water in tests at 5660-65 feet and at 5600-08 feet.

Ray Reynolds' Sallie E. Ragsdale 1 is reported to have opened a new gas field 5½ miles southwest of the town of Inez. The well perforated casing at 4530-40 feet, and after cleaning itself was shut in without a gauge being taken. It is said to be a large gasser, however. Total depth is 5796 feet with the casing set to 4543 feet, just through the gas sand from which it was completed.

Nueces County: L. M. Lockhart's Ada T. Wright 1, in the new gas area opened by the operator's Cheeves 1 just outside the Agua Dulce field, is taking a potential test after dual completing as an oil and gas well. Perforations had been made at 4830-40 feet, from which it produced an estimated 65,000,000 cubic feet of gas daily on open flow when first brought in. Another set of perforations at 5119-26 feet yielded a production of oil which on preliminary test amounted to 89 barrels daily through a 7/64-inch choke with tubing pressure 470 pounds.

Lockhart has made location for Carrie Cheeves 2, a new test in this same area which falls 2640 feet southwest of the Wright 1 and 1320 feet east of Cheeves 1, which was a gasser.

Zavala County: F. M. Ginther's Charles D. Matthews 1, shallow wildcat 8½ miles northwest of La Pryor, is attracting interest after showings at around 1800 feet. It made a drill stem test at 1740-1841 feet, using ¼-inch chokes and open for 30 minutes that showed a slight gas blow and recovered 60 feet of gassy mud showing some oil. It was coring at 1892 feet in sand with a showing of oil.

Karnes County: Southern Minerals Corporation's Joe Bartosch 1, wildcat a mile north of Falls City, Louis Manchaca Survey, is testing at the 4650-foot level and has recovered some oil. With casing perforated at 4652-55½ feet, it made a test which started flowing in 22 minutes, flowed for 4½ hours, showing pressure of only 20 to 30 pounds, and showing 5 percent oil in the flow. It made considerable wash water and salt water also, and has been squeezed in preparation for the next test.

Phillips Petroleum Company has made location for another test in the Hondo Creek field. Its G. E. Munson 2 will be located in the Carlos Martinez Grant on a 99.37-acre lease and is just 933 feet southeast of the first well on the lease.

Lewis Lawlor's J. G. Swickheimer 1, 3 miles southwest of Kenedy, in the Carlos Martinez Survey No. 1, is drilling at 4171 feet in shale.

Brooks County: Humble Oil & Refining Company's Dan Sullivan 1, wildcat 8 miles southeast of Falfurrias, is drilling slowly and recovering sand with definite showings of condensate and gas. It made a drill stem test from 7082-88 feet, open 20½ minutes and using a ¼-inch choke at bottom, which recovered 4 gallons of mud and 20 gallons of condensate. It is conditioning hole to core ahead. Last week it had recovered some light-colored condensate on a test at 6873-81 feet.

Humble's Dan Sullivan B-1, another wildcat located 16 miles southeast of Falfurrias, is drilling below 3642 feet in sandy shale after being shut down for repairs at 3232 feet.

Lavaca County: Moran Gas Company has made location for its second test in the new Worthing field recently opened in the area 4 miles southwest of Hallettsville. The new well is to be its Rudolph Spanihel 1, in the James Kerr Survey and scheduled to 6100 feet for a test of the discovery pay.

Kirby Petroleum Company will drill a 9000-foot wildcat test in Lavaca County. It will be Henry Rochelle 1, 2½ miles southeast of Hope on a 100-acre lease in the Philip Smith Survey. The Wilcox sand will be tested.

Wiess and Jones Honored By Mid-Continent Group

Harry C. Wiess, president of Humble Oil & Refining Company, Houston, and Roy B. Jones, independent operator of Wichita Falls, Texas, have been chosen to receive the distinguished service award, given each year by the Texas Mid-Continent Oil and Gas Association to men in the Texas petroleum industry.

The award is made annually to men who, over a long period of years, have made outstanding contributions as citizens of the state, to the betterment of their home communities and to the petroleum industry and their own individual enterprises.

Plaques symbolic of the award will be presented to Wiess and Jones shortly in group meeting in Houston and in Wichita Falls.

Recipients of the award are selected by a committee representing all branches of the industry. Sixteen men have been honored with the award during the past ten years.

J. H. COOK, 39, vice president of Cook Drilling Company with headquarters at Fort Worth, Texas, was killed December 1 in an auto accident near Farraday, Louisiana.

Texas Gulf Coast

Sour Lake Field New-Sand Discovery Is Completed

Sun Oil Company has completed its new-sand discovery on the west side of the Sour Lake field, Hardin County, and has made location for the next well. The discovery, Merchants Estate 1, flowed 132 barrels of 29.3-gravity oil daily through a ¼-inch choke on the official potential test, with tubing pressure 150 pounds and casing pressure 250 pounds. Casing was perforated with 176 shots from 6335-65 feet for this completion. Depth of the hole is 6590 feet with the 5½-inch casing set on bottom.

The new location, Merchants 2, is on the same lease and 1654 feet southwesterly from the No. 1 well. Permit application was for a test to 9500 feet, which would be a real deep test for the area.

Colorado County: Tide Water Associated Oil Company has made location for its next well in the new Sublime field, northwest of Sheridan in the western part of Colorado County. It will be the W. F. Albert 1, T. J. Evans Survey, 1250 feet northeast of the discovery well and it is already clearing location to start operations.

Tide Water's Underwood 1, the discovery well, has been recompleted, taking the final gauge after having installed a bottom-hole choke. It is now flowing through a 10/64-inch choke at top with another 10/64-inch choke set at 3500 feet, and is making 79 barrels of 48-gravity oil daily with tubing pressure 715 pounds and casing sealed. Gas-oil ratio is 18,180 to 1. Production is from perforations at 9500 - 9505 feet in the Wilcox sand section.

Sinclair Prairie Oil Company's Glasscock 2, north of Rock Island, is preparing to dual-complete. On latest report, it had perforated casing at 9274-80 feet and acidized before completing, with this set of perforations as one of the producing points. Total depth of the well is 10,518 feet with the casing at 10,300 feet.

Pan American Production Company's Williams 1, wildcat 8 miles west of Eagle Lake, is drilling below 7583 feet in shale.

Montgomery County: George W. Strake's P. G. Krohn W-1-B, deep Wilcox test in the western part of the Conroe field, is still drilling with no showings of great consequence reported. It was coming out of the hole to run electric logging survey late in the week after coring and drilling to 11,155 feet.

Stanolind Oil & Gas Company & Atlatl Royalty Company's McMahon 1, east of production in the Lake Creek field, is drilling below 2932 feet in sand and shale, with the Wilcox its objective.

Jefferson County: Sun is starting a deep wildcat in the Taylor's Bayou area, 17 miles southwest of Beaumont in the BBB&C Survey 396. The well, American National Bank Company 1, will go to 10,200 feet to explore the Frio sand section.

Gulf Oil Corporation is preparing to start operations on its Leo Craigen A-3, latest test for the Fannett field, being 610 feet south of the recently-completed Craigen A-2.

Jasper County: Humble Oil & Refining Company's Nona Mills Company 1, deep wildcat in the Rockland area, is being delayed by heavy rains and high

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water and has had to shut down at 10,229 feet in shale. It is scheduled to go another 2000 to 4000 feet.

Walker County: Magnolia Petroleum Company continues its campaign of deep drilling along the northern edge of the Texas Gulf Coast district with its Thompson Lumber Company A-1, in the Kittrell area in the northern part of the county, which is now drilling below 1132 feet in shale. The field, which produces from the Paluxy at a shallow depth, will have its deepest test if Magnolia reaches its objective of 10,000 feet.

☆

MAJOR ROY E. SCHOOLER, former regional chief clerk in the Bartlesville, Oklahoma, production department, Phillips Petroleum Company, is in charge of petroleum operations on the Allied Italian front.

South Louisiana

Egan Field, Acadia Parish, Gets Southwest Extension

Sun Oil Company has extended the Egan field, Acadia Parish, to the southwest in completing Mrs. C. H. Button 1, flowing 3 barrels of condensate per hour on final test. It had previously been brought in through perforations at 10,828-833 feet, where it made an unestimated amount of gas and condensate, but these perforations had been cemented off for a new set at 10,805-824 feet, where it is now flowing. Tubing pressure is 3450 pounds, the 3 barrels hourly being produced through a 3/16-inch choke.

Sun Oil Company's Sensat Pool 1, in the same field, is waiting on cement at 10,795 feet with 7-inch casing landed on bottom.

Sun's Estherwood Townsite 1, in the Estherwood area, is drilling below 9890 feet in shale.

St. Charles Parish: The Pure Oil Company has completed its second producer in the Good Hope field, with General American Transportation Company 1 flowing 155 barrels of 36.9-gravity oil daily through a 7/64-inch choke through perforations at 7824-36 feet in the discovery pay. Tubing pressure is 1225 pounds and casing sealed. This extends production one location southwest. The discovery was completed in perforations at 7830-38 feet.

Humble Oil & Refining Company's Sarpy Brothers 1, also in the Good Hope area, has spudded and set conductor pipe and is drilling below 1000 feet.

St. Landry Parish: Humble Oil & Refining Company's Prince et al 2, Krotz Springs area, was cleaning with no production gauge available. It is flowing from perforations at 9410-12 feet and showed tubing pressure of 1000 pounds. Total depth is 10,376 feet with casing at 9526 feet.

Sun Oil Company's Boagni B-3, in the North Cankton area is below 9300 feet and should reach regular field pay soon.

Danciger Oil & Refining Company has opened a new shallow gas sand for the North Cankton area with G. Pothier 1, a failure in the deep formations, drilling to 10,255 feet. It was plugged back for a set of perforations at 2790-97 feet, and has been completed, making 742,000 cubic feet of dry gas daily through a 12/64-inch choke with flowing tubing pressure 1100 pounds. The well apparently cut a fault at 10,020 feet, and found a sand with slight shows of gas at 10,050 feet, but of no commercial value. The top of the Boagni sand was reported at 9710 feet, carrying salt water.

Vermilion Parish: Further testing of Union Oil Company's State White Lake B-1, at West White Lake, has been delayed by a fishing job. It had cemented with a squeeze job through the perforations at 11,820-825 feet, in preparation for a new test, reperforated at 11,835-840 feet, and stuck the drill stem. The upper perforations were tested last week, yielding a small flow of 40.6-gravity oil but without much volume.

The Pure Oil Company's Ferguson-Benoit Unit 2, on the southeast flank of the West Gueydan Dome, in the area where Pure recently established a new producing segment around the dome, is drilling below 8700 feet, still some distance above the expected pay sand.

Cameron Parish: Stanolind Oil & Gas Company's Gulf Land B-35, East Hackberry field, has been completed from a deep sand just above 11,000 feet. Casing was perforated at 10,804-816 feet, and final gauge showed 308 barrels of 31.3-gravity oil daily through a ¼-inch choke with tubing pressure 1360 pounds and gas-oil ratio 601-1.

Gulf Refining Company's Matilda Gray C-1, Johnson's Bayou area, has resumed drilling after having shut down to install a new rig with total depth 3745 feet. This is expected to be one of the deepest wells drilled in the coastal area.

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North Louisiana

Claiborne Test Indicates Cotton Valley Production

Ohio Oil Company has been ordered to squeeze off all perforations below 8920 feet in G. W. Taylor P-1, 15-23n-8w, which has indicated oil production from the Cotton Valley for the first time in the Haynesville field, Claiborne Parish. When the squeeze job is completed the well will be allowed to produce from 2 sets of perforations: 60 shots from 8910-20 feet and 230 shots from 8835-75 feet. At present there are 5 other sets of perforations open below 8920 feet. An allowable of 225 barrels per day has been set. A test of the well last week indicated a flow of 141.28 barrels in 24 hours through 8/64-inch choke on tubing. Casing pressure was 2175 pounds and tubing pressure 1300 pounds with gas-oil ratio of 906/1.

Big West Drilling Company is drilling below 6275 feet in red shale in W. D. Algood 1, 22-22n-5w, without shows. The wildcat is a proposed Bodcaw sand test.

Concordia Parish: The Carter Oil Company's George Murray 1, 31-9n-10e, may open a new oil field or prove a 2½-mile south extension to the Lake St. John field. The well is reported to have logged sand with a possible showing of gas from 8977-81 and 8990-9055 feet. A core from 9044-54 feet recovered 10 feet of sand with oil odor in the last 1½ feet. Another core from 9054-69 feet recovered 3 feet of shale. Massive was topped at 9081 feet, and another core was taken from 9086-9101 feet, recovering 11 feet of oil stained sand.

Red River Parish: The Texas Company recovered 650 feet of gas cut mud with no showing of formation water during a 2-hour drill stem test with packer set at 6947 feet, in Semp Russ 1, 16-12n-10w. The test was made after perforating the Travis Peak horizon with 47 shots from 6972-6984 feet. A slight blow of gas recorded at surface during the test is not believed to be indicative of commercial production from this lower zone. The test has been plugged back for perforations in the lower Pettit, from 6334-45 feet.

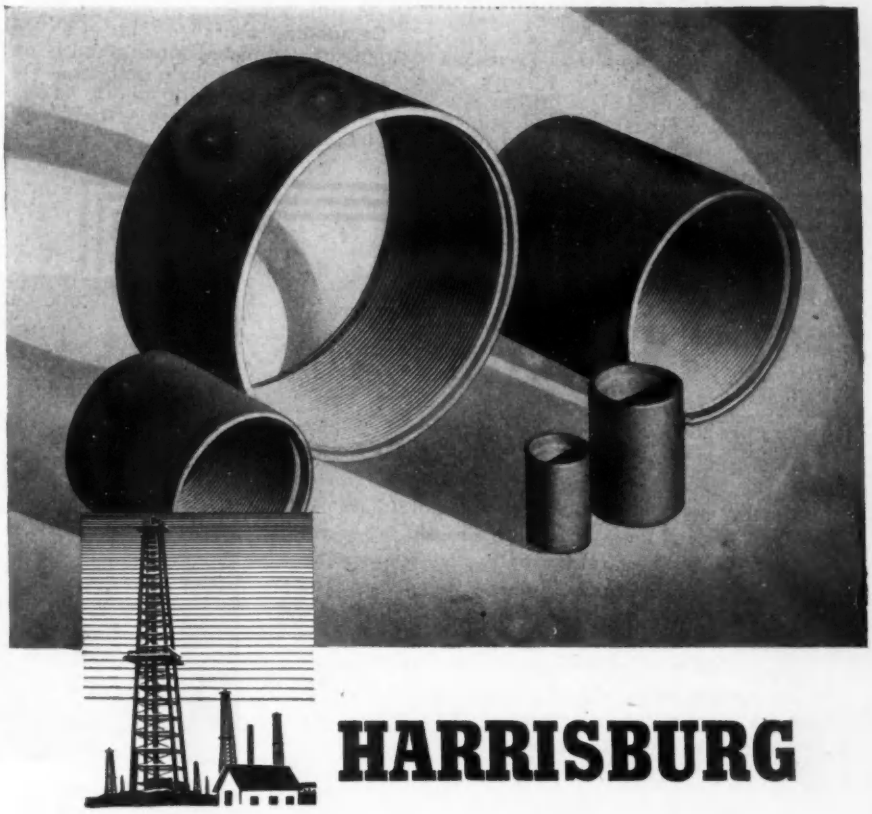
Magnolia Petroleum Company is drilling below 2550 feet in J. C. Pickett 1, C SE SE 11-14n-10w, scheduled deep test.

Richland Parish: Charles H. Murphy, Jr., delayed testing of J. E. Holt 1, 21-17n-9e, prospective oil discovery in the Delhi area, first because heavy rains made the location inaccessible for crews erecting tanks, and later to clear title on a lease of school land in the area.

Perforations of the Tuscaloosa from 3273-91 feet will be made. Tuscaloosa was topped at 3201 feet. Total depth of well is 3422 feet. The well recovered 2000 feet of 38-gravity oil during an 11-minute drill stem test of the Tuscaloosa from 3276-87 feet, with solid saturated sand indicated by electrical survey from 3273-91 feet.

Roy Fisher has taken out a permit for Graham Unit 1, 13-17n-9e, proposed 3400-foot test 3 miles east and 1¼ miles north of the prospective discovery, also in the Delhi townsite.

H. L. Woods has completed derrick at Ellett Munholland 1, NE NE 2-17n-



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9e, a scheduled 6000-foot test, north and west of Murphy's Holt 1.

Caldwell Parish: Shell Oil Company is drilling below 10,244 feet in Louisiana Central Lumber Company 1, with no further shows reported since drilling was resumed at 10,141 feet, the depth at which the well blew out of control in September. It is an indicated gas or gas-distillate field.

Catahoula Parish: The California Company completed repairs and is drilling at 8580 feet in shale in Tensas Delta Monaghan Land Company 1, 12-9n-7e, scheduled 9300-foot deep test.

Natchitoches Parish: The California Company's Annie Morrison 1, 12-13n-8w, is drilling at 2435 feet in shale with no report of oil shows. The company denied a report that a show of oil at 2100 feet had been logged.

Jackson Parish: Shell Oil Company has rigged up tools and is reconditioning hole to total depth of 8006 feet before resuming drilling in Tremont Lumber Company 1, C NW SE 22-15n-1w. Crescent Drilling Company completed its contract depth of 8000 feet, and Shell moved in one of its own rigs to deepen to 10,000 or 12,000 feet.

West Carroll Parish: Arkansas-Louisiana Gas Company is drilling below 3220 feet in shale without show of oil in Frances Briggs et al 1, NW NW 9-21n-11e. The test logged gas rock at 2855-2960 feet. Cores in this zone revealed salt water.

Morehouse Parish: The Texas Company's Susie R. Kennedy 1, C SW SE 32-22n-6e, is drilling below 6159 feet in red shale with no show of oil and gas, expecting top of Smackover within the next 200 feet.

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Arkansas

Poor Results Obtained from Most of State's Wildcats

Poor results were obtained in most of Arkansas' wildcats last week. No new wildcat locations were announced, and operators probably will wait for the new year and new budgets before starting new work.

In Miller County, Arkla Oil Company perforated R. T. Dodd 1, C SW NW 11-19s-28w, with 180 shots from 6605-30 feet in the Gloyd lime and treated with 3000 gallons of acid, then tested salt water with slight showing of gas. These perforations were squeezed and the test reperforated with 140 shots made from 6260-90 feet and also treated with 3000 gallons of acid. Crews are preparing to swab.

The Atlantic Refining Company picked up top of Massive anhydrite at 5010 feet by samples and is drilling below 5965 feet in Montana Realty Company 1, 17-17s-28w, without showings.

Union County: Marine Oil Company may abandon Thompson B-1, SE SE NE 10-18s-13w, deep test to the Smackover in the Urbana field. The well was originally a gasser at 2707 feet. No show of oil was discovered in deepening to 6492 feet, Smackover lime being topped by samples and drilling time at 6476 feet. A core from 6482-92 feet recovered 8 feet of porous oolitic lime with showing of salt water. Electrical survey has been run, indicating Smackover at a minus 6255 feet. The well is considered too low on structure for production.

Phillips Petroleum Company tested 10 percent oil and 90 percent salt water in Callie 1, 30-18s-12w, after perforating with 20 shots in a Cotton Valley sand from 4545-50 feet. A squeeze job has been made to shut off salt water, and testing will be resumed. The well is at 5008 feet, but electrical survey has not been released.

White County: Killam & McMillan is moving in rotary rig to deepen J. C. Curl 1, C NE SW 10-9n-5w. Cable drilling took the well to 2825 feet, when it has been shut down for several weeks. The well will go to 4500 feet, considered deep for this area.

Johnson County: Arkansas-Louisiana Gas Company stopped at 6110 feet in

S. M. Hudson 1, 15-10n-24w, and plugged back to 3380 feet, after electrical survey indicated lower horizons barren of oil or gas. This is the deepest test drilled in the Clarksville field, and was to have tested the Arbuckle lime.

Pope County: Stanolind Oil & Gas Company is drilling slowly with cable tools in G. B. Maxwell 1, C SE SE 18-8n-18w, but has not logged shows of commercial value.

Columbia County: McAlester Fuel Company has pumped 100 percent salt water at Baker 1, C SE NW 13-17s-20w, Magnolia field failure which was taken over as an experiment in exhausting the water by constant pumping. Atlantic Refining Company originally drilled the well, which was then taken over and tested by H. W. Wright and S. E. Mix in perforations from 5838-46, 6228-34, 5812-19, and 5838-46 feet. Operators believed that water had been allowed to accumulate and stand in formations so long that oil could not come through perforations. It now seems likely that the well will be a failure.

Grady H. Vaughn is drilling below 7485 feet in Jackson 1, C SE SW 8-16s-21w, without releasing geological tops.

Ashley County: Lion Oil Refining Company abandoned Betty 1, C NE NE 29-17s-4w, north of Parkdale, at 3006 feet. Electrical survey indicated no oil or gas showings.

WESTERN CANADA

Jumping Pound Drill Stem Test Nets Gas, No Oil

Shell Oil Company has run a drill stem test of the Madison lime in its second Jumping Pound wildcat, Shell 4-24-J lsd 4 24-25-5w5th, from 9636 to 9746 feet, after drilling several narrow streaks of slightly porous lime. The 30-minute test showed 500,000 cubic feet of gas, no water, no oil, though some indications of oil were found in cuttings from the lime. Lack of water is the most encouraging feature.

Drilling is proceeding in expectation of a thick porous zone, with 7-inch casing set at 9648 feet. Shell's first Pumping Pound test showed water in top of Madison above thick porous zones and additional water in the porous sections. The present test is on the crest of structure east of the first venture.

The British American Oil Company, Ltd., Canadian-owned major operator, has joined in the intensifying oil search in the general Princess area, on the Southern Alberta Plains 125 miles east of Calgary. The Alberta government has approved the company's application for a reservation covering about 160,000 acres of provincial oil and gas rights north of the Red Deer River. The southwest corner of the firm's holdings is about 6 miles north and northeast of Princess 8, Devonian discovery well. British American is the third major operator to go into the Princess area. Standard Oil Company of California and Imperial Oil, Ltd., were the earlier major entries in a 1,500,000-acre lease play participated in by about 30 major and independent oil groups.

British American will undertake geological and geophysical investigation of its holdings as soon as weather permits. The company plans to bring in one or more seismograph parties, probably in the early spring.

Southeastern

Production May Be Opened In Eastern Mississippi

Kirby Petroleum Company was preparing for a production test which might open oil production in the extreme eastern part of Mississippi, having set casing in its Long Bell Lumber Company 1 for tests in the Eutaw zone.

This well, in 30-1n-18e, Clarke County, drilled to 5620 feet, found showings of heavy black oil in the Eutaw sand, and has been plugged back to 4000 feet, setting a string of 5½-inch casing for production tests. Eutaw sand was topped at 3646 feet and although drill stem tests recovered mud only, operators thought it advisable to set casing. Location is 11 miles west of Gilbertown field.

In the central portion of the county, A. B. Irion et al's Long Bell Minerals Corporation 3 has been shut down for orders at 4118 feet. It topped the Eutaw at 3710 feet, and did not report any showings.

Jefferson Davis County: Gulf Refining Company's D. L. Mullins 1, important test 2½ miles southwest of the Sid Richardson discovery gas-condensate producer at Gwinville, is in process of making the first production test since setting casing at 9433 feet. Saturated sand had been reported in the Tuscaloosa, which showed 4000 feet of

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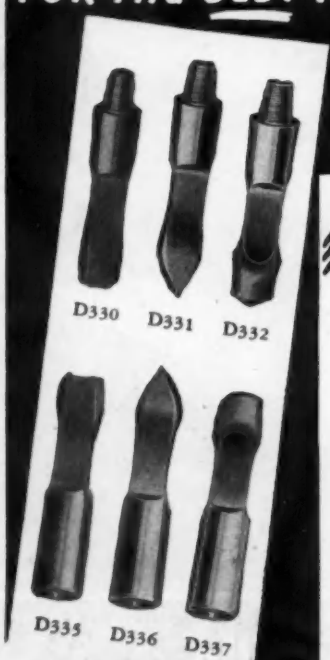
pipe line 39.6-gravity oil on a drill stem test at 9230-46 feet. Sand has been topped at 9225 feet and cored to 9243 feet. This well promises to open a high-gravity crude oil field in contrast with the heavy oil or condensate found in other recent discoveries.

Superior Oil Company's Willie Durr 1, outpost a mile east of the Sid Richardson discovery, is drilling at 9107 feet in shale and sand. It will go to the Massive zone before making any further attempts to test in the 7900-foot sand which earlier showed some distillate on a drill stem test at 7873-7902 feet.

Claiborne County: Sun Oil Company has completed its Hammett A-1, which opens a gas field on the Bruinsburg dome. After finding top of the salt at 2315 feet and drilling to 2324 feet, the operators came back up the hole to perforate at 935-945 feet in the lower part of the Moody Branch formation. It is estimated good for 5,000,000 cubic feet daily, shut-in pressure on tubing recorded at 400 pounds.

Sharkey County: British-American Oil Producing Company's F. B. Houston 3, in the Cary field, has cemented 9⅝-inch casing at 3327 feet, and was preparing to start drilling. This well is scheduled to 10,000 feet as the first deep test in the area, and will explore the lower formations.

Adams County: Humble Oil & Refining Company's Ida Stowers A-1, wildcat in the northern part of the county, is drilling at 11,545 feet in red shale with sand streaks. No showings were reported in lower formations.



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In the area south of Natchez, The Pure Oil Company's McDowell 2 is also drilling, now at 12,127 feet. It had stopped drilling for a short time at 11,848 feet to take a number of side-wall cores.

Greene County: Humble Oil & Refining Company's State Board of Supervisors, wildcat in the central portion of the county, has been abandoned by the production department and turned over to the geophysical department. It had drilled to 5573 feet in salt topped at 2060 feet and failed to find showings of oil or gas.

Grady Vaughn is preparing to drill a wildcat in the northwest corner of the county, having taken a block of approximately 4500 acres from the Goodyear Yellow Pine Company with an obligation to drill within 4 months. Humble Oil & Refining Company is said to hold about 40,000 acres in leases in this general area, and would be a probable contributor.

Warren County: Sinclair Wyoming Oil Company's Mary G. Blake 1, in 7-17n-4e, is drilling below 7515 feet in shale, having been reported in the Tuscaloosa section at this depth and looking for the Massive sand. No showings have been reported.

Georgia

In Wayne County, the California Company's Brunswick Peninsula 1, Land Lot 7, is drilling below 3315 feet. In the Roundabout Swamp 35 miles west of Waycross, Atkinson County, Sun Oil Company's Doster-Ladson 1, Land Lot 71, Land District 7, was rigging up rotary tools.

Florida

Humble Oil & Refining Company recovered twisted-off drill pipe at 2950 feet in lime, reconditioned hole and drilled to 3240 feet in lime in Gulf Coast Realties 4, 20-48s-30e, Collier County. The company's State 1, C NE NW 30-55s-36e, Dade County, is drilling at 8851 feet in anhydrite.

Gulf County: The Pure Oil Company's C. C. Hopkins 1, C SW NE 21-6s-9e, was drilling in hard shale at 8501 feet.

Alabama

W. O. Woodward, Trustee, has run electrical survey in Mary Green 2, 31-11n-4w, which indicated possible production in the Eutaw section, Choctaw County. The well has been plugged back from total depth of 3698 feet to 3540 feet and a string of 5½-inch casing cemented at 3485 feet. Testing is now waiting on cement.

Also in Choctaw County, H. L. Hunt Oil Company is drilling below 5383 feet in M. W. Smith Lumber Company 1, C NE SW 11-10n-4w, southwest of Gilbertown production.

Illinois Basin

Two Discoveries Recorded In Richland County, Illinois

The Pure Oil Company and Ohio Oil Company had a Richland County discovery and The Texas Company another last week.

Pure and Ohio's Koertge Consolidated 1, NE NE NW 33-3n-10e, during a drill stem test of McCloskey lime at 3170-80 feet, yielded 2200 feet of oil in an hour.

The Texas Company's Wright 1, NE

SW NW 24-4n-10e, in Preston township, flowed on a drill stem test of the McCloskey lime, but the amount was not reported. The well is approximately a mile east of production.

White County: W. J. Lewis et al's Burkhardt 1, SE NE SW 18-5s-9e, wildcat about 5 miles east of Carmi, recovered 400 feet of oil during a drill stem test in 45 minutes from Cypress sand at 2835-50 feet. Operators have the well shut in while deciding whether to drill deeper.

Marion County: Howard Johnson et al's Hill 1, SE NE SE 30-3n-1e, a new wildcat test, is drilling below 700 feet. The well is scheduled for a test of Benoist sand, expected at about 1600 feet.

Franklin County: Central Pipe Line Company's Rose 1, SE NE SE 4-5s-3e, has opened the Ewing pool with production of 150 barrels in 24 hours from McClosky lime at 2975-80 feet.

Deep Rock Oil Corporation's Kirk 1, NE SE SE 15-7s-4e, potential opener of the North Thompsonville pool, is still testing Aux Vases sand. After a 44-quart shot at 3115-30 feet, the well swabbed 190 barrels of oil in 24 hours.

Hamilton County: Sinclair Wyoming Oil Company's Russell 1, SW SE SW 17-7s-7e, discovery 6 miles southwest of the Rural Hills pool, is cleaning out and testing after a 40-quart shot in the Aux Vases sand at 3130-50 feet. The well swabbed 180 barrels of oil in 24 hours to open the West End pool.

Clinton County: The Texas Company's Althoff 1, SE SW SW 29-1n-3w, wildcat south of the Bartelso field, which has small production, tested 18 gallons of oil and 9 gallons of water an hour from Weiler sand at 970 feet.

Kentucky

Three wildcats were listed as probable discoveries in Henderson County.

Sinclair Wyoming Oil Company's Humphrey 2, 6-P-21, was waiting on cement with 5-inch casing set at 2635 feet for test of McClosky lime at 2555-65 feet. Operators plan to perforate through casing.

The same company was waiting on cement at McNeely 1, 23-Q-20, with pipe set at 2265 feet for Cypress sand test of saturation at 2265-80 feet.

W. F. Lacey et al's Williams 1, 4-Q-20, swabbed 70 barrels of oil in 18 hours from Aux Vases sand at 2595-2605 feet and was still testing.

Indiana

Rodgers Cartage Company's Deakin-Lynch 1, SE SW SW 25-7s-15w, which opened the West Hovey pool in the McClosky lime and which is the only producer in the pool, has been plugged back and is showing for a producer in the Aux Vases sand to open a new pay horizon for the area. Plugged back from McClosky lime at 2750 feet, casing was ripped at 2715-35 feet and after a 20-quart shot the well swabbed 45 barrels of oil in 12 hours. Testing continues.

Michigan

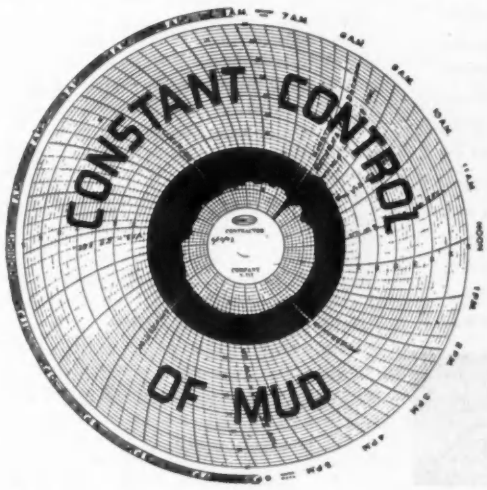
Essexville-Hampton Area Field Gets Extension

United Drillers and Producers, Inc.'s Walraven 1, NE SW NE 16-14n-6e, 1½ miles southeast extension test in the Essexville-Hampton area, logged Dundee lime objective at 2659 feet and at 2830 feet showed 1000 feet of oil in the hole. On the basis of field wells the natural showing should acidize into commercial production. It is the first important extension for the field since its discovery by United.

Ogemaw County: Muskegon Development Company's State A3, NW NE NW 29-24n-2e, Rose City field, has flowed up to 280 barrels of oil in 24 hours but production on a steady basis is expected to average from 150 to 200 barrels. Production is from 2055 feet in the top of the Traverse lime. As the first well in the field to show in this formation it probably will stimulate operations. The field was discovered on the strength of Richfield lime production between 4000 and 4200 feet. The deep wells have had relatively low potentials, generally 100 barrels per day or less.

Isabella County: Sohio Petroleum Company's Swan 1, N½ SE SW 29-16n-6w, Coldwater field, flowed 212 barrels in 20 hours natural from Dundee lime pay at 3734-36 feet, pointing to continued extension of the pool. It is an offset to a producer but is ¾ mile northwest of the discovery, indicating a fairly wide and uniform producing area.

Montcalm County: Gordon Oil Company's Paris 1, SE NW NW 6-12n-8w, Cato Township wildcat, has flowed up to 165 barrels of oil plus 400 barrels of water on a 24-hour test to a Monroe lime pay at 3552 feet. Attempts to cement off water and hold the oil pay were unsurcessful on the initial attempt. More development is assured for the area, irrespective of the final outcome of the test.



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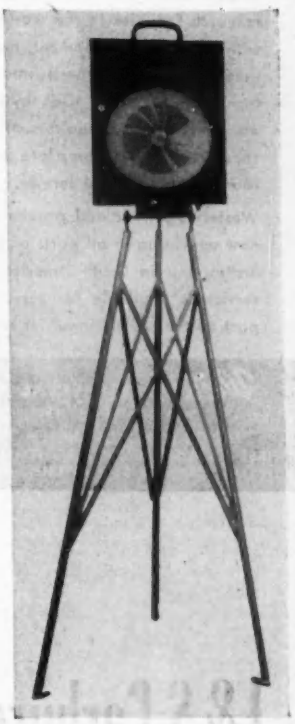
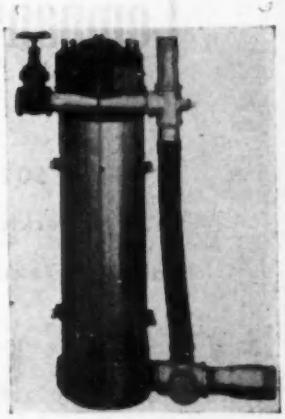
For complete details, see page 2974, of the 1943-44 Composite Catalog



Recording Unit



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California

Aliso Canyon Field Has First Eocene Production

Tide Water Associated Oil Company's Standard-Sesnon 1-4, SW NW 28-3-16, Aliso Canyon field, was good for 392 barrels of 20.1-gravity clean oil through two 48/64-inch chokes.

Production is from the Eocene sand, the first completion in the field from this horizon.

The well is located on the extreme northwest end of the field and the deep sand undoubtedly underlies the greater portion of the field, greatly adding to the Los Angeles Basin reserves. Tide Water has most of the acreage under lease and a slow development program is anticipated.

Kern County: Standard Oil Company of California's Standard-Fullerton 1, 25-27-23, near Semitropic, has logged 30 feet more of hard sand, giving a fair cut in what may be the Vedder equivalent. Present depth is 14,293 feet in hard shale. A core from 14,251-261 feet recovered 10 feet of sand. Core from 14,261-279 feet recovered 17 feet of sand, and core from 14,279-293 feet recovered 1 foot of sand and 15 feet of hard shale. Electric log is now being run.

Standard's K.C.L. 20-13, 5-31-25, world's deepest well in the Coles Levee field, was drilling at 16,084 feet in hard shale.

British-American Oil Company and Capital Company's Portals 43, 3-30-29 in the Race Track Hills field, was completed November 29, flowing 145 barrels per day of 40.0-gravity 6.0 cut oil through a 36/64-inch choke with 750/960 pounds pressure and 3,500,000 cubic feet of gas. Productive intervals are at 4650-4710 and 4735-4815 feet. This is the second completion in the field.

Kings County: Southern California Petroleum Corporation's Socal-Bergan 88-32, 32-19-20, was being abandoned November 30 at 10,448 feet in Lower Miocene shale.

Los Angeles County: Barnsdall Oil Company's R.S.F. 44, deep test of the Newhall-Potrero field, was drilling at 9018 feet. A core taken at 9008-9018 feet, with 4-foot recovery, was shale showing 40 to 60-degree dips. A core at 8773-87 feet, with 11-foot recovery, was shale showing 25 to 30-degree dips.

British-American and The Texas Company's N. L. & F. 1, 21-4-17, is conditioning hole to rerun a formation tester for a shut-off test on 4 holes at 7400 feet. Depth is 7699 feet with 7-inch casing cemented at 7475 feet.

☆

RICHARD SHINN, for 20 years a district superintendent for the General Petroleum Corporation with headquarters at Taft, California, has been promoted to assistant general superintendent for California with headquarters in Los Angeles. D. G. Kingman replaces Shinn in the Taft area.

F. N. DAVIS, formerly with Manning-Maxwell & Moore, Inc., has been appointed district manager and factory representative for the Daniel Orifice Fitting Company, Los Angeles, California, with offices at 310 Thompson Building, Tulsa.

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Trading Post Section
ON PAGE 187 OF THIS ISSUE
Because of the scarcity of certain types of new equipment and the fact that some operators may have a surplus of some items and a serious shortage of others, this **Used Equipment Forum** is performing a valuable service to operators in locating needed used materials or disposing of surpluses that may be needed by others.

U. S. Exploratory Completions

ALABAMA WILDCAT

Choctaw County—Oil Discovery: W. O. Woodward, Tr.'s Mary Green 1, 31-11n-4w, elev 145 ft, pump 17 bbls 20-gr oil, 3 bbls wtr, td 3709 ft.

ARKANSAS WILDCATS

Ashley County—Failure: Lion Oil Ref. Co.'s Batty 1, ne ne 29-17s-4w, abnd 3006 ft.

Lafayette County—Failure: Tide Water-Seaboard's J. N. Landes 1, c sw ne 4-15s-25w, anhydrite 3365 ft, James 3925 ft, Buckner 6370 ft, abnd 6636 ft.

CALIFORNIA WILDCATS

Kern County—Failure: Union Oil Co.'s Richardson 34-18, se nw 18-29-21, Gould shale 1115 ft, Carnerous 1808 ft, abnd 2086 ft.

Kings County—Failure: So. Calif. Pet. Corp.'s Socal-Bergen 88-32, se se 32-19-20, Temblor 8100 ft, abnd 10,448 ft.

FLORIDA WILDCATS

Leon County—Failure: Stanolind's St. Joe Paper Co. A-1, nw c ne ne 15-2s-2e, abnd 6520 ft.

Madison County—Failure: Hunt Oil Co.'s J. W. Gibson 3, 18-2s-11e, abnd 3525 ft.

ILLINOIS WILDCATS

Bond County—Failures: H. Luttrell et al's Ulmet 1, se nw sw 8-4n-3w, abnd 1107 ft.

Magnolia's Prater Est. 1, nw nw nw 31-7n-2w, abnd 1496 ft.

Effingham County—Failure: H. Luttrell et al's Slausis 1, nw nw ne 25-6n-5e, abnd 2532 ft.

Jefferson County—Failure: H. Sherman et al's Jefferson O&G 1, se sw ne 30-3s-2e, abnd 2605 ft.

Lawrence County—Failure: Hayes & Wolfe's Cunningham 1, sw sw sw 32-2n-13w, abnd 2842 ft.

Marion County—Failures: Ohio's Spangler 1, se se nw 1-1n-3e, abnd 2787 ft.

Continental's Simmons 1, ne ne se 22-1n-4e, abnd 2863 ft.

Gulf's Maulding 1, se se nw 14-4n-3e, abnd 2428 ft.

Wayne County—Failure: Pure's White 1, sw nw se 6-1n-9e, abnd 3237 ft.

INDIANA WILDCATS

Ford County—Failure: Texas Co.'s Hocker 1, se se nw 21-27n-9e, abnd 1048 ft.

Livingston County—Failure: Texas Co.'s Harwood 1, sw sw ne 19-27n-8e, abnd 985 ft.

Posey County—Failure: Superior's New Harmony Realty 35, sw ne ne 17-5s-14w, abnd 3155 ft.

KANSAS WILDCATS

Barton County—Failures: Bay Pet.'s Steinert 1, sec sw 2-16s-15w, Lans 3193 ft, Cong 3427 ft, abnd 3440 ft.

Vickers Pet.'s Steiner 1, ne ne se 34-17s-12w, Arb 3455 ft, abnd 3505 ft.

Cowley County—Failure: Zephyr Drlg.'s Warren 1, ne se sw 6-35s-5e, Miss 3178 ft, abnd 3215 ft.

Ellis County—Failures: W. L. Hartman's Huser 1, 3-15s-16w, Heeb 3137 ft, Lans 3189 ft, Cong 3449 ft, Arb 3512 ft, abnd 3530 ft.

J. M. Huber et al's Olson 1, swc se 18-11s-20w, Cong 3772 ft, Arb 3899 ft, abnd 3915 ft.

Gove County—Failures: Transwestern et al's

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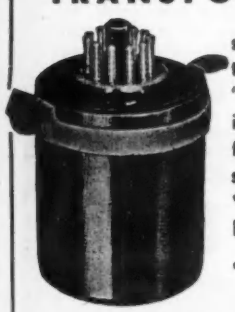

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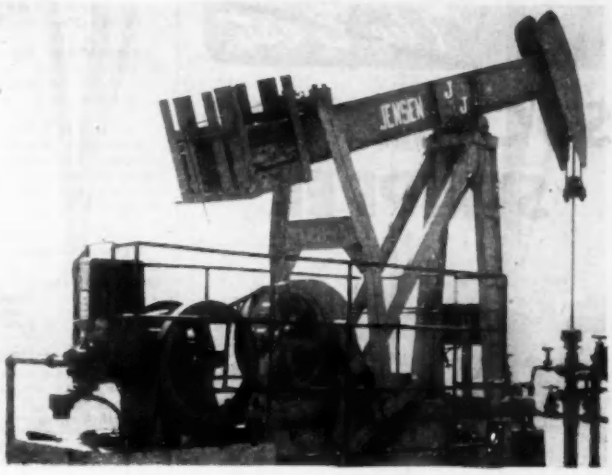

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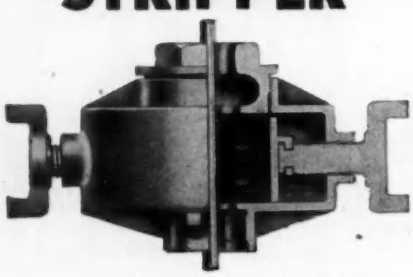

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Jones 1, nwc 9-15s-31w, Her 2490 ft, Basal 4980 ft, abnd 5027 ft.

Phillips' Fick 1, ne ne sw 24-15s-31w, Lans 3712 ft, Miss 4407 ft, Vi 4898 ft, Simp 4947 ft, Arb 4952 ft, abnd 5001 ft.

Jefferson County—Failure: Magnolia's Imus 1, se ne sw 15-10s-19e, abnd 1998 ft.

Pratt County—Failures: Wood River Oil et al's Trelaine 1, swc 14-26s-13w, Miss 4240 ft, Vi 4288 ft, Simp 4354 ft, Arb 4436 ft, abnd 4472 ft.

Anderson-Prichard's Schroeder 1, ne ne sw 33-28s-11w, Lans 3685 ft, Miss 4174 ft, Vi 4384 ft, Simp 4480 ft, Arb 4569 ft, abnd 4610 ft.

Rooks County—Failure: Helmerich & Payne's Ordway 1, sec 21-10s-18w, Lans 3322 ft, Arb 3769 ft, abnd 3784 ft.

Trego County — Failure: Sinclair Prairie's O'Toole 1, sec 26-14s-25w, Miss 4110 ft, Vi 4325 ft, Arb 4415 ft, abnd 4504 ft.

KENTUCKY WILDCAT

Daviess County—Failure: Miller & Shiarella's Payne 3, 18-O-27, abnd 1515 ft.

NORTH LOUISIANA WILDCAT

LaSalle Parish — Failure: Placid Oil Co.'s Tremont Lbr. Co. F-2, c se nw 28-9n-2e, elev 150 ft, abnd 8040 ft.

SOUTH LOUISIANA WILDCATS

Iberia Parish—Failure: Pure's L. L. Trahan 1, 2410 n 2155 e of swc 9-12s-6e, abnd 10,010 ft.

Terrebonne Parish—Failure: Louisiana Land & Exploration Co.'s LLE-Fee 1, 1972 s 1782.7 e of USCGS Station Crow in 8-20s-13e, ssw 11,958-12,010 ft, abnd 12,010 ft.

SOUTH LOUISIANA NEW PAY TEST

Cameron Parish—East Hackberry Oil Discovery: Stanolind's Gulf Land Co. B-35, 377 n&w of sec 10-12s-10w, nw flk, perf 10,804-16 ft, flow est 308 bbls 31.3-gr, ¼-in, gor 601/1, td 11,343 ft.

MICHIGAN WILDCATS

Ottawa County — Failure: Rex O&G Co.'s Huizenga 1, sw se nw 24-5n-15w, Traverse lime, abnd 1550 ft.

Saginaw County — Failure: American Dr. Co.'s Diener 1, ne se nw 4-12n-2e, Dundee lime 3312 ft, abnd 3438 ft.

MICHIGAN WILDCATS

Allegan County — Failure: Muskegon Dev. Co.'s Pegg 1, se sw sw 25-3n-14w, Traverse 1537 ft, abnd 1597 ft.

Kent County—Failure: S. L. McCall's Rector 1, ne se se 24-9n-11w, Traverse 2242 ft, abnd 2300 ft.

Oceana County—Failure: Sinclair Wyoming's Vaughn 1, nw nw se 7-15n-15w, Traverse 2150 ft, Dundee 2647 ft, Monroe 2718 ft, abnd 3400 ft.

Saginaw County—Failure: Michigan Prod. & Ref.'s Schmidt 1, se se se 1-13n-3e, Dundee 3296 ft, abnd 3467 ft.

MICHIGAN NEW PAY TEST

Ogemaw County — Rose City Oil Discovery: Muskegon Dev. Co.'s State A-3, nw ne nw 29-24n-2e. Traverse formation 2031 ft, Traverse lt 2046 ft, pay 2052-55 ft, flow 180 bbls, td 2055 ft.

NEBRASKA WILDCAT

Richardson County—Failure: E. S. Towle et al's Fritz 1, sec 34-3n-15e, Lans 882 ft, Miss 2119 ft, Hunt 2498 ft, abnd 2570 ft.

NEW MEXICO WILDCAT

Eddy County—Failure: Mark Whalen et al's Geo. Riggs-Federal 1, ne nw ne 6-20s-30e, elev 3249 ft, salt 390-1315 ft, abnd 1815 ft.

OKLAHOMA WILDCATS

Cleveland County—Failure: California Co.'s Wilson A-1, ne ne se 27-10n-1e, Dense 6189 ft, 1st Wx 6244 ft, 2nd Wx 6338 ft, abnd 6340 ft.

Comanche County—Failure: Texas Co.'s Conway 1-B, nw se nw 3-3n-10w, abnd 7155 ft.

Grady County—Failure: Olsen Drlg.'s Pfile 1, sw ne ne 32-3n-7w, abnd 3512 ft.

Okfuskee County — Failure: Public Service's Palmer 1, sw se nw 4-10n-10e, Cr 3430 ft, abnd 3459 ft.

Osage County—Failure: Norbla Oil's Osage 1, nw nw sw 4-24n-8e, Miss 2888 ft, abnd 2899 ft.

WEST TEXAS WILDCATS

Ector County—Failure: Stanolind's Midland Farms 1-L, c se sw G&MMB&A sect 36, blk 41, T-1-N, elev 2981 ft, anhydrite 1930 ft, Yates frosted grains 3130 ft, Grayburg 4580 ft, abnd 4782 ft.

Gaines County — Eubank Pool Discovery: Humble's Doss 1, c sw sw PSL sect 9, blk A-24, elev 3343 ft, anhydrite 1730 ft, Yates 2920 ft, brown lime 3950 ft, San Andres 4420 ft, flow 201 bbls 33.6-gr, ¼-in, gor 517/1, 7000 gals acid Clear Fork perf 7030-80 ft, td 9049 ft, pb 7080 ft.

Lamb County—Failure: Woodley Pet. Co.'s Bird 1, c nw se sect 66, blk T. T. A. Thomson sur, elev 3555 ft, anhydrite 1735 ft, salt 1810 ft, San Andres 3130 ft, San Angelo 4510 ft, Clear Fork 5170 ft, Tubb-Fullerton zone 5765 ft, abnd 7265 ft.

Mitchell County — Failure: Union of Cal.'s Bell 1, c se nw T&P Ry. 27, blk 29, T-1-S, elev 2182 ft, anhydrite 710 ft, San Andres 1630 ft, Clear Fork 2395 ft, abnd 3974 ft.

Pecos County—Failure: Humble's El Paso State Nat'l Bank 1, c ne ne T.&St.L. Ry. 7, blk 140, elev 2604 ft, Yates 890 ft, San Andres 1700 ft, lime 5425 ft, detrital 5230 ft, Ellenburger 8240 ft, abnd 8440 ft.

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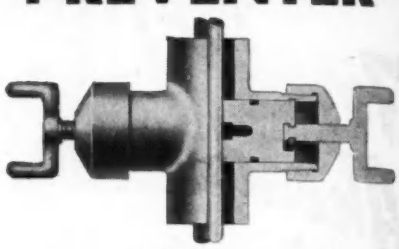

The "Double E" Blowout Preventer for sucker or polished rods works on the same principle as the stripper but is constructed somewhat differently. Instead of the soft rubber packing, cylindrical steel rams are used, to which has been molded a fabric reinforced sealing element. This oil resistant synthetic rubber element backed by the steel ram prevents leakage against high pressures.

The use of the Blowout Preventer in conjunction with the Sucker Rod Stripper provides ideal protection against handling wet rods and pressure surges in heading wells. When the two devices are used together, the top of the blowout preventer is threaded 3" line pipe male to screw into the bottom of the Stripper Housing.

"DOUBLE E" Products

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INCORPORATED

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DALLAS 9, TEXAS

WEST TEXAS FIELD OUTPOST

Pecos County—Mac-Der Gas Field Extension: Standard of Texas' Mac-Der Co. 1, lse, 5, c ne sw A&NW Ry. Co. sect 4, blk 228, 1¼ mi e by n of gas same zone, elev 2641 ft, Yates 880 ft, granite 5014 ft, 11,700,000 gas, ¼-in, tp 750 lbs, used 500 gals mud acid Wolf Camp 4790-4870 ft, td 5021 ft in granite.

WEST TEXAS WILDCATS

Coke County—Failure: Tom Ragsdale et al's Adams 1, 510 ft nsl 1200 ft ewl of 165-ac lse, Geo. Allen sur No. 2, abnd in sul w 1860-1938 ft.

Gaines County—Failure: J. F. Smith et al's Dodge 1, c se sw D&W Ry. 36, blk H, elev 3176 ft, anhydrite 2100 ft, Yates 2890 ft, brown lime 4040 ft, Grayburg 4305 ft, San Andres 4685 ft, abnd in sul w 5105 ft.

Glasscock County — Failure: Richfield Oil Corp.'s Woody 1, c se T&P Ry. 9, blk 36, T-3-S, elev 2569 ft, anhydrite 1320 ft, Yates sand 2145 ft, Yates frosted grains 2155 ft, San Andres 3710 ft, abnd 6008 ft.

Martin County—Failures: Amon G. Carter's Hyatt 1, 5580 ft snl 8346 ft ewl of 2380-ac lse and Lge 247, Hartley CSL, elev 2860 ft, San Andres 4420 ft, abnd 5510 ft.

Richfield Oil Corp.'s Clements 1, c nw sw T&P Ry. 22, blk 35, T-2-N, elev 2632 ft, anhydrite 1500 ft, Yates 2180 ft, brown lime 3365 ft, abnd 4295 ft.

Yoakum County—Failure: Skelly Oil Co.'s Hodges 1, c nw nw sect 446, blk D, J. H. Gibson sur, elev 3704 ft, anhydrite 2273 ft, top salt 2370 ft, Yates 3040 ft, brown lime 4100 ft, San Andres 4530 ft, abnd in Clear Fork 7717 ft.

WEST TEXAS NEW PAY TEST

Andrews County — Shafter Lake Deep Gas Test and Extension: Cities Service's University 1-L, c ne se sect 10, blk 14, 1½ mi sw commercial gasser same zone, elev 3209 ft, anhydrite 1720 ft, base salt 2752 ft, Yates frosted grains 2840 ft, San Andres 4310 ft, 7,734,000 gas natural via cas perf 2974-87 ft, td 6942 ft, pb 3720 ft.

WEST CENTRAL TEXAS WILDCATS

Palo Pinto County—Failure: J. E. Matthews et al's Berger 1, ne ne ne T&P Ry. 54, blk 2, abnd 1375 ft.

Taylor County — Failure: Onyx Ref. Co.'s Nease 1, 1100 ft snl 4000 ft wel E. Anderson sur No. 81, abnd 1753 ft.

SOUTH CENTRAL TEXAS WILDCATS

Frio County—Failure: Highland Oil Co.'s N. M. Johnson 1, 467 fr nw&swl 120-ac lse, M. A. Rumfield sur, elev 548 ft, so and slight blow 3961-74 ft, abnd 3974 ft.

Gonzales County — Failure: Quintana Pet. Co.'s Mrs. Ernie B. Lamkin et al 1, 1277 fr sel 464.7-ac lse 600 fr sel Winslow Turner Lge, abnd 9120 ft.

Guadalupe County—Failure: Wiegand Bros.' Paul & Emma Baumert 3, 330 fr swlu swl 1880 fr nwl 227-ac tr, Matthew Besore sur, abnd 2400 ft.

SOUTHWEST TEXAS WILDCAT

Zapata County—Failure: Bridwell Oil Co.'s Rosa G. Rodriguez 1, 467 ne of swl 6235 se of nwl sh E, 1122-ac lse, Charco Redondo Gr, abnd 1765 ft.

LOWER TEXAS COAST WILDCATS

Jackson County — Failure: Humble's Four Way Rch. C-1, 660 fr n&el blk 20, Young Coleman sur A-13 on 1002-ac lse in 2nd subdvn of Laward farms, 1 mi se of N. Laward, 1 mi s of Maurbro, tested 5208-18 ft, abnd 6400-ft test.

Moore & Ahern s A. E. Westhoff 1, 330 out of swc 80-ac lse in blk 1, Joseph Rector sur A-62, 1st hole 5858 ft, pb & st at 5684 ft, abnd 6525 ft in sdy sh.

Jim Wells County—Failure: W. A. Richardson et al's Frances Clark A-1 467 e&n of 306-ac lse, Los Presenos Gr, elev 215 ft, abnd 5816 ft.

San Patricio County—Failure: Drlg. & Exploration Co.'s W. F. Lovett 1, 1650 fr wl 467 fr sl sect 7, 320-ac lse, Geo. W. Peal subdvn of J. J. Welder Rch. s½ sect 7, abnd 6269 ft.

TEXAS GULF COAST NEW PAY TEST

Hardin County — Sour Lake Oil Discovery: Sun's Merchant Est. 1, 330 fr nl 1632 fr wl Minerva-Merchant 200-ac subdvn c lot 79, 125-ac lse, Stephen Jackson Lge, 3 mi w Sour Lake, top sand 6335 ft, perf 176 shots 6335-65 ft, flow 132 bbls 29.3-gr, ¼-in, td 6950 ft.

EAST TEXAS WILDCATS

Bowie County—Failure: J. K. Hughes Oil Co.-F. K. Lytle-Ralph Green's Howard 1, 2100 ft wel 2050 ft nsl of J. H. Dyer sur, elev 371 ft, abnd 4590 ft.

EAST TEXAS NEW PAY TEST

Houston County—Grapeland Deep Test Failure: Grapeland Oil Co.'s Horn A-1, 2250 ft ewl 1350 ft fr swl J. Herrod sur No. 511, 1st Lower Trinity failure for area, elev 512 ft, Austin chalk 5628-5958 ft, Woodbine 6018 ft, Georgetown 6908 ft, Goodland 7950-8060 ft, Paluxy 8060 ft, Glen Rose 8260 ft, 1st anhy 9665 ft, massive anhy 9895-10,026 ft, James 10,653 ft, Pettit 10,918 ft, 75,000,000 gas open flow fr regular Woodbine pay perf 6015-30 ft, td 11,074 ft, pb 6075 ft.

NORTH TEXAS WILDCATS

Archer County—Failures S. F. Hutcheson et al's Veitenheimer 1, 750 ft nsl 1024 ft wel sec 60, blk 4, Clark-Plumb sur, abnd 1123 ft.

Texas Co.'s Harrison 1, 467 ft ewl 1397 ft snl TE&L Co. sect 1846, elev 1165 ft, Bend 4888 ft, Mississippi 5572 ft, Ellenburger 5761 ft, abnd 6043 ft.

W. C. Young et al's King 1, 1310 ft ewl 1050 ft nsl TE&L Co. sect 2422, abnd 1500 ft.

Collin County—Failure: Pure's G. E. Light 1, 2529 ft snl 2062 ft ewl of 950-ac tr, John Ragsdale sur, slim-hole test, elev 641 ft, Ellenburger 3446 ft, abnd 5966 ft.

Cooke County—Sivels Bend Discovery: Texas Co.'s Rasure 1, 660 ft out nec of w 224-ac tr, John Massingill sur A-687, elev 864 ft, pump 139 bbls 35.6-gr oil fr Strawn perf 6755-63 ft, td 7518 ft, pb 6775 ft.

Jack County — Oil Discovery: Continental's Risch 1, 330 ft out sec sect 13, blk 2, Henderson CSL, 4 mi e prod, elev 1089 ft, Bend 4306 ft, Marble Falls 4858 ft, Barnett 5780 ft, Mississippi 6252 ft, Ellenburger 6300 ft, flow 392 bbls 41-gr oil, 157,000 gas, ½-in natural, fr Bend perf 4380-4420 ft, td 6407 ft, pb 4760 ft.

Montague County—Failure: Stanolind's Gossett 1, c sw sw E.T. Ry. sect 39, A-245, elev 1039 ft, Simpson 6698 ft, abnd 7100 ft.

Wichita County—Failure: Guy J. Scholl et al's Wiley 1, 1900 ft nsl and 150 ft wel blk 95, Red River Valley Lands, abnd 1801 ft.

NORTH TEXAS DEEPENED OUTPOST

Wichita County—K-M-A Ellenburger Exten-

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1—1⅛ x 1250' Wire Line.
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1—National 9" Hook.
1—Greenhead Line Scales.
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1—Steel Tool House on Steel Substructure.
1—Steel Tool Box.
1—7½" KW Light Plant with Waukesha Motor on Skids.
1—250 Barrel Bolted Steel Water Tank.
1—No. 12 Union Tool Rotary Table, 25½".
1—4½" Kelly.
1—4½" Kelly Bushings.
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7500' 4½ OD Pittsburgh Seamless Drill Pipe w/ Hughes Counterbore Joints. All necessary tools to complete a rotary rig.
Rig in operation until approximately November 27, 1944.

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1—A-80 T C A Alten Continental Pumping Unit.
5—D T 109 Ideco Pumping Units.
2—10 D Jensen Pumping Units.
1—No. 10 National Pumping Unit.
7—U-2 International Motors.
6—F C U Waukesha Motors.
1—Complete Drilling Rig, including:
1—60 ft. "A" Mast 10-inch pole with drawworks built in powered with Mercury motor.
1—Kohler light plant.
1—Novo water pump.
1—Caterpillar Diesel, 13,000 engine.
1—6 x 12 oilwell pump.
1—17" oil bath rotary table.
525 ft. ⅞" drilling pipe.
2,700 ft. 4½" drill pipe.
1—1,800 gal. fuel tank on skids.
1—550 gal. fuel tank on skids.
Drilling tools, hand tools, 7' x 9' steel dog house.

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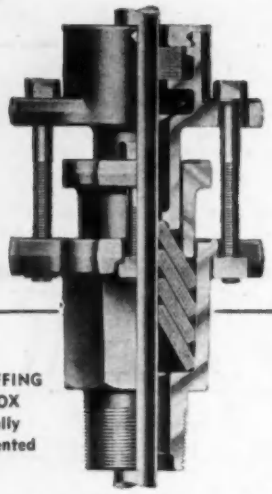

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sion: Texas Co.'s 1st Nat'l (Kemp-Allen) 27, 330 ft out nec s½ lot 15, blk 26, KWVFL, 3½ mi ne Ellenburger prod, elev 1010 ft, otd 3845 ft, Ellenburger 4094 ft, flow 48 bbls, ¼-in, after 70-quart nitro shot Ellenburger 4114-50 ft, td 4160 ft.

NORTH TEXAS NEW PAY TEST

Wichita County — Madden Deep Discovery: James Steward & Co. et al's E. B. Madden 3, 100 ft nsl 467 ft wel blk 8, Wm. Mayer sur A-193, 1350 ft se of 4300-ft disc, elev 1014 ft, Bend 5072 ft, flow 1440 bbls 40-gr, ½-in, gor 990/1 1000 gals acid Bend perf 5072-92 ft, td 5131 ft.

WESTERN CANADA WILDCAT

Southern Saskatchewan—Buffalo Gap: Norcanols Oil & Gas' Buffalo Gap 1, lsd 16 3-3-25w2nd, abnd 7767 ft.

United States Wildcat Starts

CALIFORNIA

Kern County: Richfield Oil Corp.'s Cauley 2-1, se se 16-30-29, Edison area, lcn.

Hilo Oil Co.'s Anderson 1, sw sw 8-29-21, Gould Hills area, lcn.

Rothschile Oil Co.'s McDevitt 1, sw sw 24-25-27, Jasmine area, rig.

Richfield Oil Corp.'s Hood-Bloemer 1, se sw 26-28-27, Kern Front area, rig.

Standard's Hayes 1-11, sw sw 28-27-27, Premier area, lcn.

Imperial County: Texas Co.'s Engebretson 1, sw se 8-16-16, Holtville area, lcn.

ILLINOIS

Bond County: A. M. Scroggin's Mason 1, nw nw sw 19-5n-3w, lcn.

B. F. Thompson's Elmore 1, se ne nw 11-6n-2w, lcn.

Clinton County: J. M. Conray's Vogel 1, sw se sw 33-2n-2w, dr 157 ft.

Effingham County: Joe Bender et al's Gibson 1, nw nw se 36-6n-5e, lcn.

Franklin County: Leonard Oil of Ill.'s Crowe Tr. 1, sw nw nw 1-7s-3e, lcn.

Gallatin County: Sinclair's Edward Hrs. 1, se se nw 3-9s-10e, lcn.

Madison County: Magnolia's Plocker 1, ne sw nw 10-3n-5w, dr 233 ft.

Joe Keal, Jr.'s Whitmore 2, se sw se 24-5n-6w, lcn.

Montgomery County: A. J. Hotfelder's Galbraith 1-A, ne se 14-7n-2w, dr 475 ft.

Richland County: Dee Miller Drlg. et al's Atkins 1, se se sw 11-3n-14w, dr.

Pure et al's Koertge Cons 1, ne ne nw 33-3n-10e, dr 318 ft.

Saline County: C. E. Brehm's Webb 1, se sw se 28-8s-6e, lcn.

Wayne County: Sinclair's Leach 1, sw sw nw 36-2s-5e, lcn.

White County: W. T. Lewis et al's Burkhardt 1, se ne sw 18-5s-9e, lcn.

Great Lakes Carbon's Zimmerman 1, se se sw 9-7s-10e, lcn.

KANSAS

Barber County: Superior's Ward Est. 1, nwc sw 2-31s-15w, lcn.

Barton County: Willis Hartman's Carroll 1, sec ne 2-20s-13w, mim.

Ellis County: Sunray's Huber 1-C, nwc se 19-12s-20w, rur.

Rooks County: Phil Han's Vohs 1, sec nw 18-10s-18w, dr 1500 ft.

Russell County: Kiowa Drlg.'s Washburn 1, nw nw sw 19-14s-11w, dr 555 ft.

Sedgwick County: Phillips' Northcutt 1, se sw ne 6-27s-4w, lcn.

MICHIGAN

Missaukee County: Turner Pet. Corp.'s Meyering 1, n½ ne se 29-21n-7w, der.

Monroe County: J. W. Struman's Chapman 1, ne ne nw 29-5s-10e, lcn.

Montcalm County: Wadsworth and McClures' Wilson 1, sw sw sw 5-9n-6w, rig.

Genesee County: H. H. Heinig's McCarty 1, se se sw 11-9n-8e, lcn.

Gratiot County: Sohio's Kellogg 1, n½ se nw 16-10n-3w, dr.

Tuscola County: Wicklund Development Co.'s Commett 1, se se nw 3-14n-10e, lcn.

MISSISSIPPI

Jefferson Davis County: Superior of Calif.'s Alex Thompson 1, sw nw nw 21-9n-18w, lcn.

Jones County: Sohio's C. R. Huddleston 1, sw ne 3-9n-10w, lcn Tuscaloosa test.

Lamar County: Superior of Calif.'s R. Batson et al 1, ne sw 17-1n-16w, lcn 11,000-ft test.

NEW MEXICO

Lea County: E. J. McCurdy, Jr. et al's (was Ward-J. D. Barefield & Cox) State-Young 1, c ne nw 20-18s-32e, dd fr 1350 ft, to test 4800-ft San Andres.

OKLAHOMA

Grady County: Olsen Drlg.'s Johnson 1, nw se 35-6n-8w, bldg dk.

Grant County: Ace Gutowsky's Shipley 1, nw nw se 33-27n-3w, rig.

Logan County: Eason Oil's Threadkill 1, sw sw sw 13-15n-3w, rig.

McClain County: Cities Service's Lawson 1, sw nw 22-5n-4w, lcn.

WEST TEXAS

Crockett County: Ben Banner et al's L. B. Cox, Jr. 1, 4924 ft snl 1246 ft ewl I&GN Ry. 29½, blk 2, lcn 2000-ft cable test.

Watchorn O&G Co.'s Thompson 2, 330 ft out sec I&GN Ry. 74, blk 1, lcn 1500-ft cable test.

Pecos County: Cardinal Oil Co.'s Lowrey-Wilson 2-A, ne sw sw T.C. Ry. 20, blk Z, sp 2500-ft cable test.

Standard of Texas' F. G. Baldwin 1, c ne se H&GN Ry. 26, blk 8, rur 3500-ft test.

WEST CENTRAL TEXAS

Coleman County: Wm. R. Moss, Sr. et al's Moss 1, 960 ft snl 1120 ft ewl Toyah Creek Irrigation Co. sur No. 70, lcn 2150-ft cable test.

Jack Story, Jr. et al's J. L. Wilkerson 1, 1459 ft snl 760 ft ewl GH&H Ry. 3, blk 2, lcn 2000-ft cable test.

Jones County: Wm. D. Brookover and H. R. Burden's Ella Brinkley 1, 330 ft snl 990 ft ewl s½ sw T&P Ry. 11, blk 15, lcn 2550-ft cable test.

SOUTH CENTRAL TEXAS

Bastrop County: Federal Royalties Co.'s E. E. Barnett 1, start nwly cor 150.9-ac lse, L. C. Cunningham sur, go se alg swl 2196 ft, th ne at ra 330 to lcn, 2000-ft test.

Wilson County: L. D. Ormby's Williamson Heirs 1, 330 fr s&wl Williamson Heirs 240.6-ac tr, M. Contis sur, 9 mi ne of Floresville, elev 375 ft, lcn 5500-ft test.

SOUTHWEST TEXAS

Jim Hogg County: Robt. T. Wilson's John Allen 1, 467 n of swl sur 280, 2400 e of swl sur, 962-ac lse, lcn 3800-ft test.

Webb County: R. F. Schoolfield's Killam-Bruni 1, 330 fr nl 740 fr wl blk 2, 320-ac lse, Las Albercas Gr, Brown subdvn, elev 883.6 ft, lcn 2750-ft test.

LOWER TEXAS COAST

Fayette County: Continental's E. A. Arnim 1, 330 fr s&el 30-ac tr 5 out of 372.2-ac lse, J. S. Menefee ½ Lge, lcn 5500-ft test.

Hidalgo County: Barnsdall Oil Co.'s C. F. Winfield A-1, 467 fr e&sl 100-ac lse and blk 44 Manual Gomez Gr, lcn 7500-ft test.

Hamman O&R Co.'s John & George Hamman 2, 5278 fr el 11,016 fr nl Jackson subdvn of Milado tr, 24,000-ac lse, San Salvador del Tule Gr, lcn 8000-ft test.

Jackson County: Navidad Co.'s F. Westhoff 1, 467 fr nl 2173 fr wl Thos. Menefee sur A-52, 40-ac lse, lcn 7000-ft test.

Jim Wells County: Republic Nat. Gas Co.'s Chas. L. Scott 1, 330 fr e&sl lot 9 330 fr sl blk 4, LaGloria twnsite, lcn 6800-ft test.

Karnes County: Superior's Y. Y. Wilbern 1, 1348 fr nwl 330 fr swl 277.7-ac lse, C. C. Rogers sur A-371, lcn 9500-ft test.

Victoria County: Sohio's Albert J. Albrecht 1, 660 fr nw&swl 386-ac lse, Cecelia de la Garza sur, lcn 6000-ft test.

TEXAS GULF COAST

Brazoria County: Stanolind's Adolph D. Suderman 1, 660 fr se&swl 267.2-ac lse, HT&B sur 9, 5 mi s se of Alvin, Chocolate Bayou area, lcn 11,500-ft test.

Colorado County: Shell's M. B. Knoche 1, Sheridan Outpost test, start sec James Alley sur A-62 go 1750 w alg sl 660 n at ra to lcn, 10,500-ft test.

Grimes County: C. H. Murdick's Myrtle Stoneham 1, 330 fr n&wl 80-ac lse 3630 s 7480 e of nwc of Franklin Greenwood sur, 2 mi n of Stoneham, lcn 4000-ft test.

Wharton County: John G. Mayo-Superior Drlg. Co.'s W. C. Hodges 1, 990 ne of RR row 2050 nw of sel of 204.7-ac lse, R. Jones sur A-36, 1 mi e of Wharton, ru.

NORTH TEXAS

Cooke County: Sam Y. Dorfman et al's J. L. Townsley 1, 330 ft out swc of 218-ac tr, Wm. Slingland sur A-897, 1¾ mi sw Myra, lcn 2500-ft test.

Jack County: Panhandle Ref. Co. et al's T. H. Cherryhomes 1, 467 ft nsl 2498 ft fr m/w/wl R. S. Gorder sur A-126, 7 mi se Jacksboro, lcn 5500-ft Ellenburger test.

Wilbarger County: Pennowa O&G Co.'s Waggoner Nat'l Bank 1, 450 ft ewl 150 ft snl blk 45, Waggoner Colony Lands, lcn 2000-ft test.

Young County: Fain & McGaha et al's H. O. Prideaux 1, 3741 ft snl 330 ft fr m/w/el A. Rohus sur, A-240, lcn 5000-ft Ellenburger test.

Squeaks from the Bull Wheel

Super-Salesman

"I can't decide between the divan and the arm chair."

"Lady, you can't make a mistake on a nice chair like this."

"Okay, I'll take the divan."

Come, Come, Now

Boy, looking with amazement through a telescope: "Gawd!"

"Go on," said a friend. "It ain't that powerful."

Some Jokeski, Eh?

"Nothing is impossible."

"No? Ever try to take a pair of skis through a revolving door?"

Cupid's Footprint

"When I kissed you then, a new love was born."

"Okay, but you better wipe that birth mark off. Here comes your wife."

Reasons Cited

A soldier wrote home that he had met three Chinese sisters who weren't married. Their names: Tu-Yung-Tu, Tu-Dum-Tu and No-Yen-Tu.

This Isn't the Army

Sergeant: "The man who sneaked out of the barracks last night and met a girl in the woods back of the camp will step forward—Hey! Company halt!"

Secondary Recovery Provides MORE OIL FOR WAR

Complete practical experienced engineering service, including:

Preliminary Surveys
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We invite your inquiries and would like to cite you references and show you actual performance records.

PETROLEUM ENGINEER
JO H CABLE
WICHITA FALLS TEXAS

Definitions

A wise monkey is a monkey who doesn't monkey with another monkey's monkey.

Alimony is the high cost of leaving.

A submarine is a ship with water on all four sides of it.

Pajamas are those things that honeymooners keep under the polliw in case of fire.

A little boy is a noise with dirt on it.

A filing system is a hiding place for correspondence.

A corset is a hindrance to good feeling.

A censor is a fellow who knows more than he thinks you ought to.

Shells Are So Scarce

"Why so glum?"

"I went hunting yesterday and shot at a duck flying over."

"Oh. Missed him, eh?"

"No, he fell dead to the ground, but I was wasting a perfectly good shell. The fall would have killed him anyway."

Just For The Records

"Are you Santa Claus?"

"No."

"Then leave my stockings alone."

Poet's Nook

Lady dressed in coat of fur,
Lady at the cocktail bar,
Lady, how I wish you were
Half as naughty as you think you are.

Pre-War, Too!

Wife: "This isn't our baby. You took the wrong carriage!"

Husband: "Sssh! This one has rubber tires."

Also Educational

Girls are like newspapers: They have forms; they always have the last word; back numbers are not in demand; they have great influence; you can't believe everything they say; they're thinner than they used to be; they get along by advertising; and every man should have his own and not try to borrow his neighbor's.

Wasted Apology

"Darling, I guess you were pretty mad at me for coming home at 4 a.m. with this black eye."

"No my sweet. You didn't have it when you came home."

Report From the War Front

"Her lips quivered as they approached mine. My whole frame trembled as I looked into her misty eyes. Her body shook with intensity as our lips met. My chin vibrated and my chest shuddered as I drew her close.

"Then I shut off the motor of the jeep."

DR. KIRK BRYAN of Harvard University was guest of honor and speaker at a dinner given by the Oklahoma City Geological Society.

TOM L. WILLIAMS, JR., accountant and assistant secretary-treasurer of Cardinal Oil Company, has been promoted to company manager and has been succeeded as accountant by Harold E. Tips.

UNIBOLT
THE ONE BOLT COUPLING

ELBOW ROOM FOR STEAM LINES

UNIBOLT "Flex-Ball" Joints permit high-temperature lines to expand and contract without placing strain on connections.

THORNHILL-CRAVER COMPANY
HOUSTON

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STANDCO BRAKE LINING
Is the driller's best friend because it makes the easiest brake known and "feeds off" evenly while drilling. It never scores brake rims. See page 2808 Composite Catalog.
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823½ Monroe Street, Fort Worth, Texas

W. P. JENNY
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Specializing in MICROMAGNETIC SURVEYS, GEOLOGICAL INTERPRETATIONS and CORRELATIONS of seismic, gravimetric, electric and magnetic surveys.
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HOUSTON, TEXAS

Notes for the Equipment Buyer and User

High Pressure Pump
CONSTRUCTION MACHINERY COMPANY

Construction Machinery Company, Waterloo, Iowa, is offering a high pressure centrifugal pump that will deliver 60 gallons per minute against 250 pounds pressure, with a 10-foot suction lift.

At lower pressures the pump will deliver up to 550 gallons per minute.

Mounted on oil field skids, the outfit weighs approximately 1600 pounds. Recommended to furnish water through water supply systems for production or drilling operations, the pump will also handle crude.

Chief Engineer Appointed By Bailey Meter Company

P. S. Dickey

H. H. Gorrie

Bailey Meter Company, Cleveland, Ohio, announces the appointment of P. S. Dickey as chief engineer, a position in which he will supervise engineering, research and design activities. He will be assisted by H. H. Gorrie, assistant chief engineer, and R. E. Clark, manager of contract engineering.

Dickey is a mechanical engineering graduate from Purdue University and has served the company in various engineering capacities since his graduation in 1925.

Gorrie is a graduate of Rensselaer Polytechnic Institute and has been associated with Bailey since his graduation in 1927.

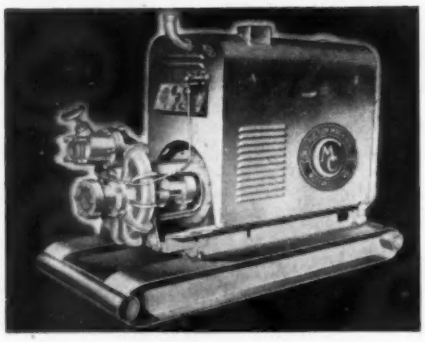
Clark is a graduate of the University of Kentucky and has completed more than 20 years service with the company as field engineer, meter engineer and automatic control engineer.

Plastic Coating Described

Amercoat Division, American Pipe and Construction Company, Terminal Annex, Los Angeles, California, has published a new folder describing the properties of Amercoat No. 33 plastic coating. Technical facts presented range from application, coverage, and colors to degrees of weathering, moisture absorption and transfer, and resistance to chemical fumes, splash and over-flow of acids, alkalies, salts, oils and water.

Kelley Official Named

Ben F. Kelley Company, Tulsa, manufacturers of oil field safety equipment, has appointed Edward L. Carter, 30 Rockefeller Plaza, New York, its export representative.



Construction Pump

Acid and Alkali-Resistant Metal Coating Is Developed

The Union Bay State Chemical Company, Cambridge, Massachusetts, announces Chlorinated Isopol, a new synthetic said to be practically identical to chlorinated rubber in flame resistance, moisture resistance, chemical resistance, solubility, stability and compatibility with plasticizers.

The material is suggested as an acid and alkali-resistant coating for metal, concrete and other surfaces.

Wins Promotion

American Steel & Wire Company, U. S. Steel subsidiary, Cleveland, Ohio, announces promotion of Willis T. Cramer to assistant director of research. He began his association with the company in 1929. He is a graduate of Ohio State University.

Eastern Sales Manager for U. S. Rubber Company Named

United States Rubber Company, Rockefeller Center, New York, has appointed James E. Power as eastern sales manager of the mechanical goods division.

He began his rubber career in 1906, five years later became a salesman, and in 1926 was appointed manager of the New York branch of the mechanical goods division. Later he became assistant manager of branch sales.

James E. Power

Dallas Sales Representative Appointed by Bucyrus-Erie

Bucyrus-Erie Company, South Milwaukee, Wisconsin, has added G. E. (Bert) Ponder, Odessa, Texas, to its sales organization. He will be stationed at the company's office in Dallas in charge of oil well spudder sales. He has had 16 years experience in the cable-tool drilling equipment field, and formerly conducted his own drilling and well-servicing business at Odessa.

Centrifugal Bulletin

Merco Centrifugal Company, Hobart Building, San Francisco 4, California, has published a bulletin, No. 501, describing "The Separation of Suspended Solids," and the application of centrifugals.

George E. Failing Company Presented with 'E' Award

The George E. Failing Supply Company was awarded the Army-Navy "E" flag and pennant at a formal ceremony, shown above, in October at the company's main plant in Enid, Oklahoma. High-ranking Army and Navy officers, officials of national, state and city governments and representatives of many oil companies were among the nearly 1000 persons who attended the ceremony.

The company has been engaged in production of portable water well drilling units for the Army and special valves for the Navy since shortly after Pearl Harbor. Branches of the company are located at Houston and Wichita, Kansas.